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Distribution of common Reproductive Tract Infections (RTIs) among Symptomatic Females Attending out Patient Department in a Rural Tertiary Care Hospital in Central India

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ABSTRACT

Introduction: Prevalence of RTIs in females are very high and vary widely country to country and also region.

Aim: The present study was aimed to look distribution of common RTIs in symptomatic females attending obstetrics and gynaecology OPD of a rural tertiary care hospital in Central India.

Methods: Four high vaginal swabs and blood for serum was collected from each patient. Sample were processed for wet mount, gram stain, culture,VDRL and Mod. TPHA.

Results: 500 females were screened for presence of symptoms of RTIs and 33.4% (167/500) had one or the other symptoms of RTIs. Candidiasis (25.14%) including non albicans candida and Bacterial vaginosis (23.95%) were the most prevalent infections followed by *Trichomonas vaginalis* 12/167 (7.1%) and syphilis 3/167 (1.7%).

Conclusion: We observed laboratory confirmed predominance of candidiasis and BV in both urban and rural population and in pregnant as well as non pregnant females. Presence of considerable amount of infections in pregnant females calls for a routine screening of RTIs in this group. Also, clinically diagnosed *Candida* infection should be confirmed to species level as the NAC are more resistant to treatment leading to recurrent Vulvovaginal candidiasis.

Key Words: Reproductive Tract Infections (RTIs), Syphilis, Candida, Bacterial vaginosis, *Trichomonas vaginalis*

INTRODUCTION

Reproductive health of women has now-a-days become focus of attention due to its importance in women's own health & her family members, socioeconomic development, and population programmes. The reproductive health status of women in the developing countries especially India, always required urgent attention. Over one-third of all healthy lives lost among adult women are due to reproductive health problems (WHO, 1995).[1] Reproductive tract infections (RTIs) include three types of infection :

1) **Sexually transmitted diseases (STDs)** - such as gonorrhoea, chancroid, and human immunodeficiency virus (HIV);
2) **Endogenous infections** - which are caused by overgrowth of organisms normally present in the genital tract of healthy females, such as vulvovaginal candidiasis and bacterial vaginosis; and
3) **Iatrogenic infections** - which are associated with improperly performed medical procedures such as unsafe abortion or poor delivery practices.

The studies conducted in India shows high prevalence of RTIs.[2] A broad based study conducted in different parts of the country revealed a prevalence varying from 19 to 71 percent.[3] RTIs can be caused by bacterial, parasitic, fungal or viral agents. The prevalence of these infections vary widely all over the globe due to differences in population, different types of studies and their reporting methods. The present study was

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undertaken to see the distribution of common RTIs in symptomatic females of reproductive age group attending the Obstetrics and Gynaecology out patient department (OPD) of a tertiary care rural hospital.

MATERIAL AND METHODS

This cross-sectional laboratory based observational study was conducted in the Department of Microbiology of a tertiary care rural hospital and teaching institute located in Central India. This study was approved by Institutes Ethical Committee dated 14/11/2014 with letter reference No. MGIMS/IEC/MIRC/ 77/2014.

Total 500 females attending the OPD from Jan 2015 to Sep 2016 were screened for presence of symptom/s of RTIs. As per inclusion criteria, women with age between 18 to 45 years and presenting with any symptoms of RTIs like vaginal discharge, pruritis or irritation, non menstrual lower abdominal pain, dyspareunia etc. were included in this study. Females who were menstruating, on antibiotics since last 2 weeks, having vaginal pessaries, having major diseases of reproductive tract like cervical cancer, uterine prolapse, fibroid uterus or hysterectomised females were excluded from the study.

Sample collection and processing

Per speculum examination was performed and the vaginal mucosa was inspected for presence of inflammation, erythema, lesions, and discharge. Vaginal swab was collected from the lateral vaginal wall and posterior fornices of vagina. Also, characters like amount, colour, odour, nature (thick curdy, frothy, watery) of discharge, if any, was also noted. Discahrge was considered abnormal if it was profuse or moderate in amount; yellowish, greenish in colour, thick curd like or frothy in nature, with or without an offensive odour. We collected four swabs per patient in sterile tube with 0.5 ml of sterile 0.9% normal saline. Blood was collected for serum for diagnosis of Syphilis.

Study protocol was followed as shown in **Figure I.**

STATISTICAL ANALYSIS

Statistical Analysis was done by using Descriptive and Inferential stastics using χ^2 test and software used in analysis were SPSS 17.0 version, Graphpad Prism 6.0 version and $p<0.05$ was considered as level of significance.

RESULTS

Out of 500 females screened for symptoms of RTIs, 167 (33.4%) females had one or the other symptom/s of RTIs. Amongst these 167 females, 57 (34.13%) were from urban population and 110 (65.86%) were from rural population. The median age was 28.53 years (in group 21-30 years). 44 (26.34%) females were pregnant, 68.18% were in third trimester of gestation (30/44).

Vaginal discharge was the common symptom seen in 58.68% followed by symptoms of vaginitis like vaginal irritation, itching or pruritis associated with discharge in 45.4% **(Figure 2)**. Amongst 58.68% patients presenting with vaginal discharge, 48.97% had white mucoid or mucupurulent discharge, foul smelling greenish whitish discharge showed presence of bacterial vaginosis infection in 60% cases but was present in other infections as well **(Table I)**.

Amongst 167 females with symptom of RTIs, infections in 58.08% (97/167) were confirmed by laboratory investigations. Candidiasis (CA) 42/167 (25.14%) and Bacterial vaginosis (BV) 40/167 (23.95%) were prevalent infections irrespective of patients age followed by *Trichomonas vaginalis* (TV) 12/167 (7.1%) and least prevalent was syphilis 3/167 (1.7%)**(Figure 3 and 4).** 59 out of 97 (60.82%) lab confirmed etiologies were seen in interquartile age group range of 21-30 years. Among 42 candida isolates, 35 (83.33%) were *Candida albicans* and 7 (16.6%) were Non albicans candida (NAC) (*C.tropicalis* (n=4) *C. guilliermondi (n=1), C.kefyr (n=1), C.krusei (n=1).* Mixed infection of bacterial vaginosis and candidiasis was detected in four females (2.3%). In pregnant females, candidiasis was the most prevalent i.e. 36.36% (16/44), followed by bacterial vaginosis, 25% (11/44) and *T. vaginalis* infection in 4.5%. Syphilis was not found in pregnant females.

Gram stain of the vaginal swab showed clue cells in 38 (38/40) i.e. 95% of cases. Growth of *Gardenerella vaginalis* was seen only in 22 (55%) cases BV, on human blood bilayer medium with Tween-80 but it also grew from swabs of patients who were not diagnosed as BV in 11 cases (6.58%). *T. vaginalis* was detected by wet mount in 8(66.66%) cases and 12 (100%) cases detected by culture which was the gold standard.

There is a significant relationship between percentage of cases with respect to educational status. We observed a lower rate of infection with high educational status in our study. Maximum infections were prevalent in illiterate patients and patients with primary schooling but the difference between the two was not up to the significant level. Least infections were seen in females who were qualified. **(Figure 5)**

DISCUSSION

Our study showed 33.4% symptomatic prevalence of RTIs in symptomatic females of reproductive age group attending obstetrics and gynaecology OPD. Different studies in

India showed symptomatic prevalence ranging from as low as 7.8%[4] to as high as 92%.[2] Studies conducted by Khan KA *et al.*[5] , Narayankhedkar A *et al.*[6], Balamurugan SS *et al.*[7] showed percentage between this range including our study.

In our study, maximum patient's presented with vaginal discharge i.e. 58.68%. Vaginal irritation / itching or pruritis associated with discharge was present in 45.5%. Next common symptoms were lower abdominal pain 35.92%. These complaints were present singly but mostly in combination with other symptoms like pruritis, itching/irritation, lower abdominal pain, dyspareunia.

Candidiasis (n=42), 25.14% was leading infection present in females followed by BV (n=40) 23.95%, *Trichomonas vaginalis* (7.1%) f and 1.79% showed presence of Syphilis. We have also isolated Non albicans Candida (NAC) in 16.6 % cases of total candida isolates. Many studies are now showing increasing isolation of Non albicans Candida (NAC)[8,9] from vulvovaginal candidiasis.

As **Table II** shows, the range of candidiasis infection is from 7.5% - 30%, that of BV is 4.1% - 41%, TV is 2.1% - 13%, syphilis 0.2 % - 17.88% . Except for Syphilis, our study shows comparable results with other studies mentioned in the table. Some variation may be attributed to population included, diagnostic tests, type of study etc. Some remarkable variations are present in our study to point. The prevalence of Syphilis is remarkably lower as compared to study done by Kiran A *et al.*[14] It can be explained by the tests used for diagnosis of the infection. We have used VDRL and Modified TPHA (to confirm) it. Any serum sample which was reactive by VDRL was subjected to Mod. TPHA and only after confirmation by it, serum was labelled reactive for syphilis. This could explain lower prevalence of infection in our study group. Prevalence of TV is higher in our study as compared to other studies as we have used culture for diagnosis of TV which increases the sensitivity of diagnosing the infection.

Table III shows sensitivity and specificity of some important diagnostic tests found in our study.

16.6% Non albicans candida species were also isolated in our study. As they pose more resistance towards common antifungal agents and thus leads to more suffering due to repeated and recurrent non responding infection if treatment is based on syndromic management, there should be emphasis on laboratory confirmation to species level in candidiasis patients.

With respect to the age, we found that maximum prevalence of RTIs are seen in age group of 21-30 years in both urban and rural population. We have also noted that with increase in age, the prevalence of RTIs decreased. This finding is consistent with most of the other studies.[7,15]

In our study, there is remarkable prevalence of RTIs in pregnant females (68%). These infections are known to produce inevitable outcomes in pregnancy. This alarms for a needful action in this group of females because of the complications associated with these infections in pregnancy. Increase number of cases were seen in third trimester of gestation. These infections are more seen in third trimester of pregnancy because as pregnancy advances, various hormonal changes take place and thus occurrence of endogenous RTIs increases.[16] Overall, candidiasis was the most prevalent infection seen in pregnant women (36.36%) followed by BV (25%), TV (4.5%).This finding is nearly consistent with findings of a study by S Sangeetha *et al.*[17] The increased incidence of vaginal candidiasis in pregnant women may be due to elevated levels of progesterone and estrogen. Progesterone has suppressive effects on the anti-*Candida* activity of neutrophils. Estrogen has been found to reduce the ability of vaginal epithelial cells to inhibit the growth of *Candida.*[18]

We found that more infections are seen in multigravida women. In our study, 65.78 % multigravida females had RTIs. This is in accordance with a study conducted by Rathore *et al.*[19] Multigravida women are exposed to more number of deliveries, more contraceptive device insertion & removal and gynecological surgeries, in all contributing to more handling or manipulation with the reproductive tract leading to increased susceptibility to RTIs in these women.

The level of education was significantly related to prevalence of infection. Illiterate females and females with primary schooling contributed most to the pool of infection (69.46%). The significant relationship between education and health is a well established fact. Education clears various misconceptions about many illnesses including RTIs and encourages preventive practices. Our finding is consistent with some other studies.[20,21,22]

Prevalence of RTIs is more in rural population in our study. This group of females are less educated and socioeconomically backward as compared to the females of urban population. Considering the high prevalence of RTIs in group of patients representing in the OPD, we can think of the actual incidence and prevalence in whole rural population in and around our area and this calls for a speedy action to be taken by health care providers to reach to one and all females of this group and providing education, counselling and if needed laboratory support and treatment.

We could not diagnose etiological agent in 70 patients. There are over 30 etiological agents causing RTIs. As we did not looked for all etiological agents could be the possible reason why 70 patients remained undiagnosed. Sample from Obstetric and Gynaecology OPD were collected as per convenience. Population representing in the OPD might not be the exact representative population of the community and thus results could not be extrapolated to the community level. Many of the epidemiological markers were not looked for in our study. These are some limitations of our study.

CONCLUSION

We present here the distribution of some common RTIs in symptomatic females of reproductive age group attending obstetrics and gynaecology OPD. We observed etiological predominance of candidiasis and bacterial vaginosis with considerable prevalence of trichomoniasis and non albicans candida infection. This indicates the need for microbiological investigation up to species level in cases of *Candida* infections, to ensure appropriate management. Also, in some patients, typical vaginal discharge was not present which may mislead to syndromic management. Infections were also seen in pregnant females indicating to screen for RTIs in pregnant females apart from routine screening tests like HIV, VDRL.

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Conflict of interest

We declare that there are no conflicts of interest.

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Table I: Nature of vaginal discharge with respect to the infection

Type of discharge	Bacterial vaginosis	Candidiasis	*T.vaginalis*
White/grayish white mucoid / mucopurulent discharge n=47 (47.95%)	16(34%)	19(40.4%)	05(10.6%)
Thick curdy white discharge n=34 (34.69%)	11(32.3%)	25(73.5%)	01(2.9%)
Frothy greenish / whitish discharge n=2 (2%)	-	-	01(50%)
Foul smelling white / greenish discharge n=10 (10.2%)	6(60%)	3(30%)	1(10%)
Thin white discharge n=5 (5.10%)	3(60%)	-	1 (20%)

Table II: Comparison of different studies showing prevalence of different RTIs/STIs

RTIs	Present study	Ray *et al.*[10]	Narayankhedkar *et al.* [6]	Prasad *et al.*[11]	Pawnarkar *et al.*[12]	Garg *et al.*[13]	Kiran A *et al.*[14]
CA	25.14%	20.2%	30%	10%	7.5%	19%	26.1%
BV	23.95%	4.1%	17.3%	18%	19%	41%	-
TV	7.1%	2.1%	-	13%	3.5%	4%	-
Syphilis	1.79%	1.1%	-	0.2%	-	4%	17.88%

CA-candidiasis; BV-Bacterial vaginosis; TV-*Trichomonas vaginalis*

Table III: Sensitivity and specificity of some important diagnostic tests found in our study

	Sensitivity	Specificity	PPV	NPV
For BV				
Whiff test	85%	89.76%	73.91%	95%
pH	100%	88.97%	74.07%	100%
Gram stain	95.23%	100%	100%	98.45%
For TV				
Wet mount	75%	100%	100%	97.47%
For syphilis				
VDRL	100%	97.04%	37.50%	100%

PPV – Positive predictive value ; NPV – Negative predictive value

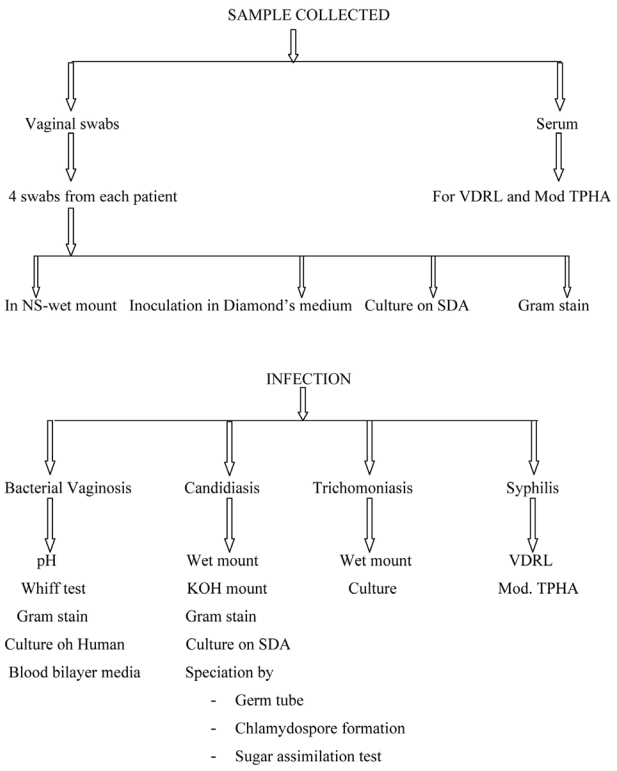

Figure 1: Flowchart showing methodology of the study.

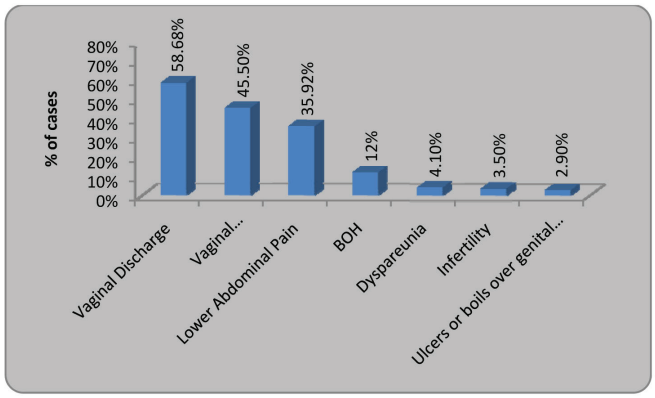

Figure 2: Showing percentage of females with respect to symptoms.

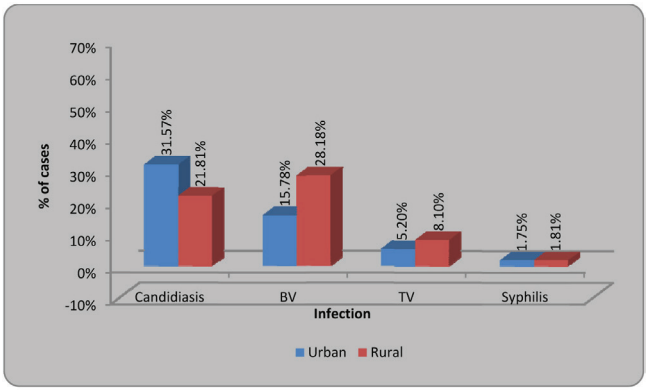

Figure 3: Showing percentage of cases in urban and rural females.

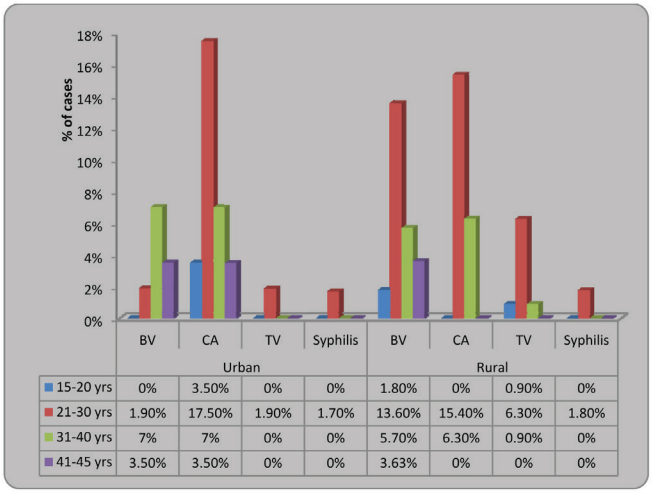

Figure 4: Showing percentage of cases with respect to age groups in urban and rural females.

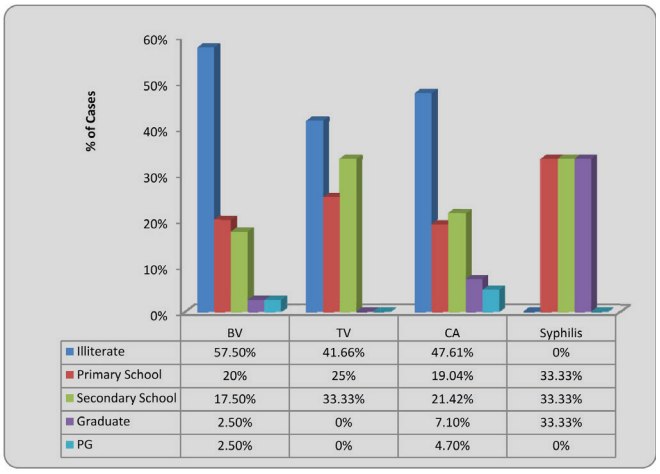

Figure 5: Showing percentage of infections with respect to patient's educational status.