REPRODUCTIVE TRACT INFECTION IN WOMEN ATTENDING OBSTETRICS AND GYNAECOLOGY DEPARTMENT OF A TERTIARY CARE HOSPITAL IN BIHAR

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ABSTRACT

BACKGROUND

Reproductive tract infection (RTI) is a common problem among women and represents a threat to their health. RTI including sexually transmitted disease (STD) and HIV/ AIDS are increasingly being recognised as a serious public health problem. The most common long-term sequelae are pelvic inflammatory disease (PID), cervical cancer, infertility, spontaneous abortion and ectopic pregnancy, which may lead to maternal death. The common infective agents are *Gardnerella vaginalis*, *Trichomonas vaginalis*, *Candida* species and *Neisseria gonorrhoeae*. Agents such as toxoplasma, rubella, CMV and HSV are important causes of infections during pregnancy. Most of the TORCH infections cause mild maternal morbidity, but have serious foetal consequences.

MATERIALS AND METHODS

Study Design- This prospective observational study was conducted in the Department of Microbiology, in a tertiary care medical college hospital in eastern Bihar. A total of 200 high vaginal swabs were collected in duplicate from an equal number of patients attending Obstetrics and Gynaecology Department with symptoms suggestive of RTI. In the laboratory one swab was used for culture and identification of the organism, the other was used for direct microscopic examination (Gram stain and wet mount) and other tests like amine test and measurement of pH.

RESULTS

Maximum patients were seen in the age group of 21 - 30 years, 43.5% (87/200). Least number of cases were seen in the age group of < 20 years 2.5% (5/200). Out of the 200 samples processed in the laboratory, 88 were found to show no growth. The most common isolate was *Candida* species, 25.5% (51/200). *Neisseria gonorrhoeae* 0.5% (1/200) was the least common organism isolated. Moreover, the overall rate of isolation of organisms was higher in patients with bad obstetric history.

CONCLUSION

Vulvovaginal candidiasis was the most common RTI followed by trichomoniasis and bacterial vaginosis. A single case of gonorrhoea was detected. Interestingly, the incidence of RTI was higher in patients with bad obstetric history.

KEYWORDS

Reproductive Tract Infection, Pelvic Inflammatory Disease, Bad Obstetric History.

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BACKGROUND

Reproductive tract infection (RTI) is a common problem among women and represents a threat to their health. Various socio-economic factors are responsible for the development of this disease entity, especially in a country like ours. Infection in the vulva, vagina or cervix represents lower reproductive tract infection and infection in uterus, fallopian tubes and ovaries are considered as upper reproductive tract infection.¹

RTI including sexually transmitted disease (STD) and RTI including sexually transmitted disease (STD) and HIV/ AIDS are increasingly being recognised as a serious public health problem. The poor health of Indian women is a concern at both national and individual level. Women are not only more susceptible than men to these infections, but also are more prone to develop complications because infection in women is difficult to diagnose and therefore more likely to go untreated.²

RTIs often cause discomfort and lost economic productivity. The most common long-term sequelae are pelvic inflammatory disease (PID), cervical cancer, infertility, spontaneous abortion and ectopic pregnancy which may lead to maternal death. The presence of a sexually transmitted infection increases the risk of acquiring and transmitting HIV infection by three to five times and bacterial vaginosis may be a cofactor for HIV transmission, especially among younger women.³

The common infective agents are *Gardnerella vaginalis*, *Trichomonas vaginalis*, *Candida* species and *Neisseria*

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gonorrhoeae. Agents such as Toxoplasma, rubella, CMV and HSV are important causes of infections during pregnancy.

Most of the TORCH infections cause mild maternal morbidity, but have serious foetal consequences.⁴

It is well realised that at least 12% - 15% of all recognised conceptions end in miscarriage and pre-clinical pregnancy loss rate is still higher (22% - 30%). At present, there is no implicating evidence that bacterial and fungal infections can cause recurrent abortions.⁵ Studies have shown that these infections predispose the patients to acquisition of viral infections like HSV-2 and HIV, which in turn can lead to premature birth and spontaneous abortions.⁶

Reproductive tract infection is the commonest cause of morbidity in the reproductive age group, but the actual magnitude of the problem is grossly underestimated due to serious problems like social stigma. It is therefore imperative that proper initiation must be taken by health care providers to facilitate the diagnosis and treatment of such cases.

The present study was taken up with a view to determining the spectrum of microorganisms responsible for causing reproductive tract infection in our hospital setting and to find a possible correlation between their isolation pattern and obstetric history of the patient.

MATERIALS AND METHODS

This prospective observational study was carried out in a tertiary care medical college hospital in eastern Bihar. Institutional Ethical Committee clearance was taken before conducting the study. A total of 200 high vaginal swabs were collected in duplicate from an equal number of patients attending Obstetrics and Gynaecology Department with symptoms suggestive of RTI. A brief clinical history regarding occupation, personal hygiene etc. was noted. Obstetric history and history of any antibiotic uptake either topically or systemically was also noted down. Swabs collected were immediately sent to the laboratory for further processing.

In the laboratory one swab was used for culture and identification of the organism, the other was used for direct microscopic examination (Gram stain and wet mount) and other tests like Whiff test (amine test) and measurement of pH.⁷

Gram stained smears were further scored as per scoring system of Nugent et al. A score of ≥ 7 was indicative of bacterial vaginosis, score of 4 - 6 was taken as intermediate and score of 0 - 3 was considered as normal.⁸

Identification of the organisms isolated was done by study of colony morphology, Gram's staining and motility followed by a battery of biochemical tests.^{7,9}

Neisseria gonorrhoeae was identified by colony morphology on chocolate agar, Gram's stain morphology, catalase, oxidase and rapid carbohydrate utilisation tests.⁷

Gardnerella vaginalis was identified on the basis of presence of β -haemolytic colonies on human blood Tween 80 bi-layer medium, presence of Gram variable bacilli on Gram staining, starch and raffinose fermentation and hippurate hydrolysis tests.⁸

Candida species was identified by germ tube test, chlamydospore formation on cornmeal agar, sugar fermentation and sugar assimilation test.⁷

Statistical analysis of results was done using the chi-square test. P-value ≤ 0.05 was considered to be significant and p-value ≤ 0.001 was considered to be highly significant.

All statistical analysis was carried out using online statistical software at-

http://www.physics.csbjmu.edu/stats/contingency_NROW_NCOLUMN_form.html; accessed on 14.02.2018. All media and reagents were procured from HiMedia Laboratories, Mumbai.

RESULTS

A total of 200 females were inducted into the study, out of which maximum number of patients were seen in the age group of 21 - 30 years, 43.5% (87/200) followed by age group 31 - 40 years, 39.0% (78/200). Least number of cases were seen in the age group of < 20 years 2.5% (5/200) [Table 1].

Out of 200 women, 84.5% (169/200) were multiparous, only 15.5% (31/200) were nulliparous. Among the multiparous women 157 had a good obstetric history (GOH), while 12 had a bad obstetric history (BOH) [Table 2].

On microscopic examination of vaginal swabs 3% (6/200) patients showed presence of clue cells, 10% (20/200) showed presence of *Trichomonas sp.* and yeast-like cells were seen in 31% (62/200) of samples [Table 3].

Overall, RTI was seen in 48.5% (97/200) of patients in the study group, whereas 44.0% (88/200) showed no growth. The most common isolate was *Candida* species 25.5% (51/200) followed by non-albicans *Candida* species 5.5% (11/200) and *Gardnerella vaginalis* 3% (6/200). *Neisseria gonorrhoeae* 0.5% (1/200) was the least common organism isolated. *Trichomonas vaginalis* could be detected by wet mount examination in 10% (20/200) of patients. The overall rate of isolation of organisms was higher in patients with BOH. The differences in rate of isolation of various organisms in patients with GOH, BOH and nullipara was found to be highly significant ($p = 0.000$) [Table 4].

As per Nugent criteria, 7% (14/200) of patients were found to have bacterial vaginosis. Out of these 14 patients, both Whiff test and vaginal pH ≥ 6 was found to be positive in 85.7% (12/14) and *Gardnerella vaginalis* could be grown in only 42.9% (6/14) of cases [Table 5].

Age	No. of Married Patients (%)	No. of Unmarried Patients (%)	Total
≤ 20	2 (1.0)	3 (100.0)	5 (2.5)
21-30	87 (44.2)	0	87 (43.5)
31-40	78 (39.6)	0	78 (39.0)
41-50	30 (15.2)	0	30 (15.0)
Total	197	3	200

Table 1. Age-Wise Distribution of Married and Unmarried Patients

Parity	No. of Patients	Percentage
Multiparous with good obstetric history	157	78.5
Multiparous with bad obstetric history	12	6.0
Nulliparous	31*	15.5
Total	200	100.0

Table 2. Obstetric History of Patients with RTI

*All married and unmarried women who never conceived were included in nullipara.

Diagnostic Procedure	Clue Cells (%)	Trophozoites of Trichomonas (%)	Yeast-Like Organisms (%)	No. Relevant Findings (%)
Wet-mount (n= 200)	6 (3.0)	20 (10.0)	62 (31.0)	112 (56.0)
Gram stain (n= 200)	10 (5.0)	NA	62 (31.0)	128 (64.0)

Table 3. Microscopic Findings in Patients with RTI

Organisms Isolated/Detected	Multiparous with Good Obstetric History (%)*	Multiparous with Bad Obstetric History (%)*	Nulliparous (%)*	Total No. (%)
<i>Candida albicans</i>	44 (28.0)	4 (33.3)	3 (9.7)	51 (25.5)
<i>Non-albicans Candida species</i>	8 (5.1)	2 (16.7)	1 (3.2)	11 (5.5)
<i>Gardnerella vaginalis</i> [†]	5 (3.2)	1 (8.3)	0 (0.0)	6 (3.0)
<i>Trichomonas vaginalis</i> **	17 (10.8)	3 (25.0)	0 (0.0)	20 (10.0)
<i>Neisseria gonorrhoea</i>	0 (0.0)	1 (8.3)	0 (0.0)	1 (8.3)
Growth of normal flora	17 (10.8)	1 (8.3)	5 (16.1)	23 (11.5)
Sterile	66 (42.0)	0 (0.0)	22 (71.0)	88 (44.0)
Total*	157	12	31	200

Table 4. Isolation Pattern of Different Organisms in Patients with RTI

- [†]isolated in only 6 of the 14 cases of bacterial vaginosis **detected by microscopy only.
- *p value= 0.000.

Patients with Bacterial Vaginosis (n= 14)	Whiff Test	Vaginal pH			Nugent Scoring			Growth of Gardnerella Vaginalis
		pH ≤ 4	pH 4-6	pH ≥ 6	0-3	4-6	≥ 7	
No. of Positive Cases (%)	12 (85.7)	00	02 (14.3)	12 (85.7)	00	00	14 (100.0)	06 (42.9)
No. of Negative Cases	02 (14.3)	14 (100.0)	12 (85.7)	02 (14.3)	14 (100.0)	14 (100.0)	00	08 (57.1)

Table 5. Positivity of Various Tests in Patients with Bacterial Vaginosis

DISCUSSION

Majority of the patients (43.5%) were in the age group of 21-30 years, followed by the age group of 31 - 40 years (39%). Least number of patients (2.5%) belonged to the age group of ≤ 20 years. This is probably due to the fact that RTIs are more common in the sexually active reproductive age group. Most of the patients, 197/200 were married. Other authors have also reported a higher rate of RTI in married patients as compared to unmarried patients.¹⁰

Majority of the patients were multiparous 84.5% (169/200), only 15.5% (31/200) were nulliparous which included three unmarried females. Of the multiparous women, 12/200 had BOH. Another author also reported that incidence of RTI increases with parity. RTI was least common in nulliparous (6%) and highest (76%) in multiparous women.¹¹

Candida species were the most common isolate with an isolation rate of 25.5% (51/200) for *Candida albicans* and 5.5% (11/200) for non-albicans *Candida* species. *Neisseria gonorrhoeae* of 0.5% (1/200) was the least common isolate. 11.5% (23/200) samples showed mixed bacterial growth, while 44% (88/200) samples were sterile. The high percentage samples showing no growth in culture were probably due to use of self-medication or use of ointments or lotions by the patient. Bacterial vaginosis was seen in 7% (14/200).

Patnaik and Sahu (2008) has reported Candidiasis in 33.9% of cases, Bacterial vaginosis in 14.3%, *Trichomoniasis* in 12.5% and *N. gonorrhoeae* in 1.8%.¹² Similarly, Madhivanan and Bartman (2009) have reported the prevalence of *T. vaginalis* as 8.5% as compared to 10% in our present study.¹³ In another study the incidence of bacterial vaginosis was reported as 20%, Candidiasis as 12.5%, *N.*

gonorrhoeae as 1.2% and *T. vaginalis* as 4.1%. These findings are quite different from those of the present study.¹⁴

The rate of isolation of various organisms from patients with BOH was higher as compared to those with GOH. *Candida albicans* was seen in 33.33% of patients with BOH as compared to 28.03% in GOH, non-albicans *Candida* species in 16.67% of patients with BOH versus 5.09% in GOH. *Gardnerella vaginalis* 8.33% in BOH versus 3.18% in GOH. *Trichomonas vaginalis* was seen in 25% of patients with BOH as compared to 10.83% of patients with GOH.

The differences in isolation rates of organisms in the three groups of patients with RTI viz. multiparous with GOH, multiparous with BOH and nulliparous was found to be highly significant (p value < 0.001). The higher rate of isolation from patients with BOH is probably due to the fact that although these organisms alone are not very important causes of PID, their presence predisposes carriers to acquire other STIs such as HIV and HSV2 virus that have been implicated in causation of endometritis (PID), resultant BOH and infertility.

CONCLUSION

The institution where this study was conducted is located in a small town in eastern Bihar and mainly caters to the rural population of the adjoining areas. This area is part of the Kosi belt, a region known for its poor developmental activities. Consequently, the general population residing here, especially the females are illiterate with poor personal hygiene and occurrence of RTI is a common ailment. In the present study, RTI was seen in 48.5% (97/200) of patients. Vulvovaginal candidiasis was the most common RTI, followed by *trichomoniasis* and bacterial vaginosis. A single case of gonorrhoea was detected.

Studies have shown that common bacterial and fungal agents responsible for RTI do not directly lead to premature

births or recurrent abortions, but their presence predisposes the patients to acquisition of sexually transmitted infections like HSV-2 and HIV, both of which can lead to complications during pregnancy. In our study, the incidence of RTI was higher in the patients with BOH which corroborates the above theory.

Hence, efforts should be made for early diagnosis and treatment of RTIs, as it not only leads to morbidity and distress in patients but it may result in complications during pregnancy, PID and sometimes infertility.

Awareness and sensitisation towards the problem, so that women take proper and complete course of medications rather than reverting to traditional methods of disease control is the need of the hour. New methodologies and interventions should be set up both at service provider level as well as beneficiary end to bring down prevalence rates of RTI.

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