

Prevalence of reproductive tract infections in women attending a tertiary care center in Northern India with special focus on associated risk factors

Nisha Chaudhary, Rajkumar Kalyan, Mastan Singh, Jyotsna Agarwal, Sabuhi Qureshi¹

Departments of Microbiology and ¹Obstetrics and Gynaecology, King George's Medical University, Lucknow, Uttar Pradesh, India

Address for correspondence:

Dr. Rajkumar Kalyan, Department of Microbiology, King George's Medical University, Lucknow - 226 003, Uttar Pradesh, India.

E-mail: drrkalyan1973@yahoo.co.in

Abstract

Background: Reproductive tract infections (RTIs) continue to present major health, social, and economic problems worldwide, and their complications are the most important causes of morbidity and mortality for women, especially in developing countries. Interest in RTIs and their management has increased tremendously because the presence of a RTI in the sexual partner increases the risk of acquisition of HIV. **Aims:** The aim of this study is to know the prevalence of RTIs, its correlation with clinical features and associated risk factors in women of reproductive age group attending a tertiary care center in Lucknow. **Materials and Methods:** The present study was conducted on 318 women of the reproductive age group (18–45 years) attending the RTI/sexually transmitted infection clinic at our center; they were evaluated for the prevalence of following RTIs: Chlamydia, gonorrhea, syphilis, bacterial vaginosis, trichomoniasis, and candidiasis; their correlation with clinical features and associated risk factors. **Results:** The prevalence of reproductive tract infections in women attending our centre reported 9.7%. The prevalence of candidiasis was maximum (11.5%) followed by chlamydia (4.1%), syphilis (4.1%), bacterial vaginosis (1.73%), and trichomoniasis (0.57%). None of the women were found positive for gonorrhea. The most common presentation was genital discharge (52.8%) followed by lower abdominal pain (45.2%). **Conclusion:** The factors found to be significantly associated with RTI were illiteracy ($P < 0.05$), unemployment ($P < 0.05$), history of RTI in patient ($P = 0.001$), and the presence of RTI in their partner ($P < 0.05$). The genital discharge was the most common presentation.

Key words: Bacterial vaginosis, chlamydia, gonorrhea, reproductive tract infections/sexually transmitted infection, syphilis, trichomoniasis

INTRODUCTION

Sexually transmitted infections (STIs) remain a growing public health issue accounting for significant morbidity worldwide. In 2012, the World Health Organization (WHO) estimated that there were 498.9 million cases of treatable STIs occurring among adults aged 15–49 years globally.

Reproductive tract infections (RTIs), including STIs continue to present major health, social, and economic problems worldwide, especially in developing countries.^[1-6] The complications of these are the most important causes of illness and death for women.^[7,8] Failure to diagnose and treat STI/

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Chaudhary N, Kalyan R, Singh M, Agarwal J, Qureshi S. Prevalence of reproductive tract infections in women attending a tertiary care center in Northern India with special focus on associated risk factors. Indian J Sex Transm Dis 2019;40:113-9.

Access this article online

Quick Response Code:



Website:

www.ijstd.org

DOI:

10.4103/ijstd.IJSTD_17_16

RTI at an early stage in women of reproductive age group may result in serious complications and consequences, including pelvic inflammatory disease, infertility, fetal wastage, ectopic pregnancy, genital cancer and premature death, as well as neonatal and infant infections.^[9-11] The presence of a STI/RTI in the sexual partner increases the risk of acquisition of HIV^[12,13] and hence, effective control of STI/RTI is a strong and most cost-effective strategy for preventing the transmission of HIV also. It is estimated that approximately 500 million people worldwide become ill each year with one of the four STIs, namely, chlamydia, gonorrhea, syphilis, and trichomoniasis, 75%–85% of which occur in developing countries. In India, about 6% of the adult population suffers from STI/RTI.^[14]

Many prevalence studies for RTIs based on symptoms have been conducted throughout the country in both rural and urban areas. However, there is a paucity of studies on STI/RTI based on laboratory confirmation from north India in recent years. This study was conducted to estimate the current prevalence of RTI among north Indian women of the reproductive age group.

Aim of the study

The aim of this study was to know the prevalence of RTIs, its correlation with clinical features and associated risk factors in women attending a RTI/STI clinic at a tertiary care center in Lucknow.

MATERIALS AND METHODS

The study was conducted in the postgraduate Department of Microbiology and STI clinic in Queen Mary's hospital associated with the Gandhi Memorial and Associated hospital of King George's Medical University, Lucknow. This was a hospital-based prospective observational study. The duration of the study was 1 year from August 2014 to July 2015. The study was conducted on 318 women of the reproductive age group (18–45 years) attending the RTI/STI clinic at our center. The two samples consisted of 2 vaginal swabs (if vaginitis suspected), 2 cervical swabs (if cervicitis suspected), and 2 mL of venous blood (if syphilis suspected) were collected. For the diagnosis of gonorrhea, gram-staining was done and culture was done on chocolate agar (Biomérieux SA, France).^[15,16] For *Chlamydia trachomatis* antigen detection, direct fluorescence assay test was performed by commercially available kit (Chlamydia T, Bioscientifica S. A.) according to the manufacturer's guidelines [Figure 1]. For candidiasis KOH mount, gram stain and culture

on Sabouraud's dextrose agar slopes were done. Identification of *Candida* was done after growth by gram staining, saline wet mount, and lactophenol cotton blue mount. Final identification of isolated fungi upto species level was done by tests like germ tube test, morphological characteristics on cornmeal agar and production of coloured colonies in CHROM agar medium.

Speciation was done by germ tube test, morphological characteristics on corn meal agar and color production on CHROM agar^[17] Trichomoniasis was diagnosed by morphology and motility testing on direct wet mount examination [Figure 2]. Bacterial vaginosis was diagnosed by saline wet mount, gram stain (Nugent's scoring), pH test, and the Whiff test.^[18] Syphilis was diagnosed using the venereal disease research laboratory (VDRL) test, and the Treponema pallidum hemagglutination assay (TPHA) was performed on VDRL reactive samples by a commercial kit– IMMUTREP TPHA, Omega diagnostics [Figure 3].

Ethical assessment

The research protocol, including the questionnaire, was ratified by the institutional review processes of the Ethical Committee of King George's Medical University, Lucknow. The participants were informed of the purpose and the methods of the study. The participants gave written informed consent before enrollment into the study. The names and addresses of participants were not included to maintain confidentiality

OBSERVATIONS AND RESULTS

The prevalence of RTI in reproductive age group women was 9.7% at our center. Nearly 318 women of the reproductive age group presenting with the complaints of RTIs symptoms were enrolled in the study from which 344 samples were received, out of 344 samples, 74 were cervical (148 cervical swabs),

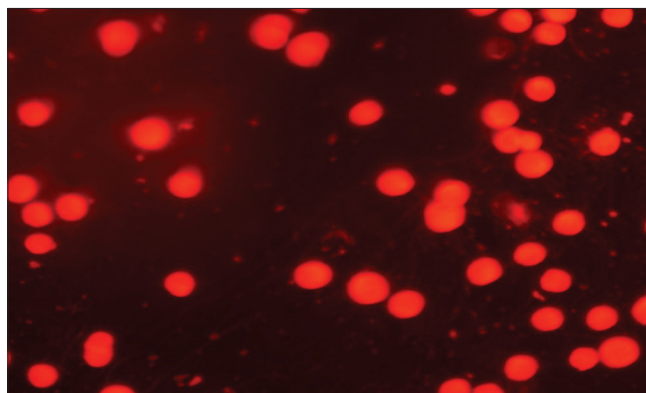


Figure 1: Elementary bodies of *Chlamydia* (direct fluorescence antibody)

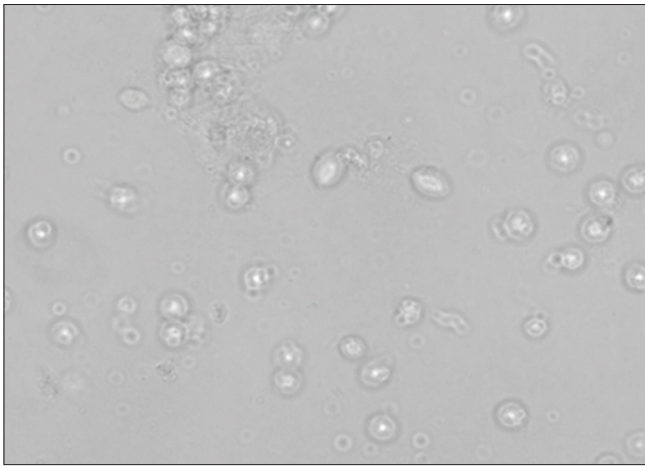


Figure 2: *Trichomonas vaginalis* on wet mount

174 were vaginal (348 vaginal swabs), and 96 were venous blood. From 26 women, both vaginal and cervical swabs were collected. Out of 74 women suspected with cervicitis, three were diagnosed having chlamydial infection, out of 174 women suspected with vaginitis, 24 were tested positive (candida, bacterial vaginosis, and *Trichomonas vaginalis*), and out of 96 women suspected with syphilis, four were positive for syphilis. The prevalence of candidiasis was maximum (11.5%) followed by chlamydia (4.1%), syphilis (4.1%), bacterial vaginosis (1.73%), and trichomoniasis (0.57%). None of the women were found positive for gonorrhoea. Out of 20 cases of candidiasis, maximum i.e., 10 (50%) were infected with *Candida glabrata* followed by 7 (35%) *candida albicans* and 3 (15%) *candida tropicalis*. The most common presentation was genital discharge, i.e., in 52.8% women followed by lower abdominal pain 45.2%, itching of genitalia 31.7%, burning during micturition 27%, increase frequency of micturition 26.8%, erythema of genitalia 24.2%, and backache 22%. STIs were the most common infections in the age group of 18–25 years. The factors found to be significantly associated with the prevalence of STI were illiteracy, occupation, history of RTI, and symptoms suggestive of RTI in their partner [Tables 1 and 2]. Other factors studied were social class according to the BG Prasad's scale, area of living, religion, parity, history of abortion or premature birth, infertility, and use of contraceptive method [Table 3]. Although these factors were not found to be significantly associated. In maximum women, the discharge was thick, curdy white in nature followed by thick, purulent, and foul-smelling [Table 4].

DISCUSSION

In this study, the prevalence of RTI reported 9.7%. In the present study, the overall prevalence of RTI in

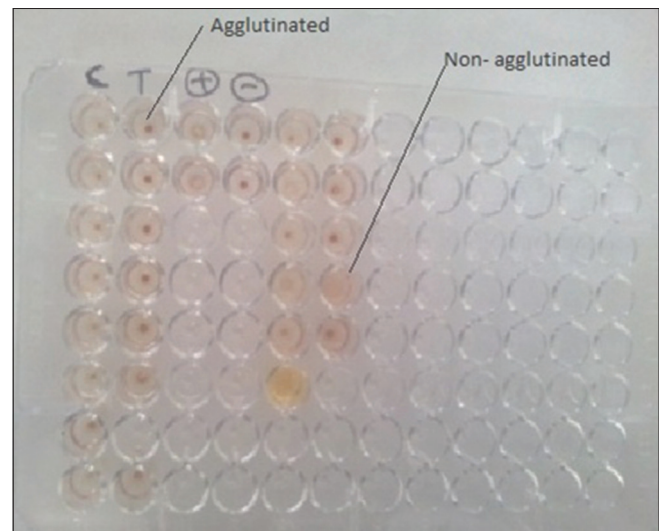


Figure 3: *Treponema pallidum* haemagglutination assay: (C-control cells, T-test cells, and positive control and negative control)

the reproductive age group of women slightly less to the prevalence found in earlier studies done by Jindal *et al.* and Samanta *et al.* who reported the prevalence 11.75% and 13.6%, respectively.^[5,19] Jindal *et al.* done their study on rural population where the prevalence may be high due to poor hygiene and lack of awareness on RTI/STI while Samanta *et al.* included the HSV-2 also in their study include polymerase chain reaction for the diagnosis of RTI which is more sensitive than culture method for the diagnosis which may be the cause of more prevalence of RTI in their studies population. Ravi *et al.* found the prevalence of RTI 14.5% among reproductive age group women and consider the presence or absence of RTI based only on asking questions whether they had experienced any infections of RTIs for the past 6 months before the study,^[20] and hence the prevalence is more than the present study. Another study was done by Majhi *et al.* found the higher prevalence of RTI 22.5% among adolescent girls in an urban slum of Sambalpur. Higher prevalence of RTI reported in these studies may be due to different criterion of RTI diagnosis as only on the basis of interview and symptoms of the subject not confirmed by laboratory testings. and evaluation of symptoms such as vaginal discharge, genital ulcer, genital itching, abdominal pain, and burning sensation during micturition was used to assess the prevalence of RTI/STI.^[21] In a study done by Hegde *et al.*, the prevalence of RTI was 39.1% in a peri-urban underprivileged area in Bangalore, and data collection instrument in their study was an interview schedule that was prepared using the family health awareness campaign questionnaire and the WHO interview schedule for the diagnosis of STI.^[22] These could be attributed to

Table 1: Demographic major factors affecting the prevalence of reproductive tract infections

Factors	Total number of women	RTI positive, n (%)	RTI negative, n (%)	P
Age groups (years)	18-25 (n=103)	16 (51.6)	87 (30.3)	>0.05
	26-30 (n=109)	10 (32.3)	99 (34.4)	
	31-35 (n=59)	2 (6.5)	57 (19.8)	
	36-40 (n=23)	1 (3.2)	22 (7.7)	
	41-45 (n=24)	2 (6.5)	22 (7.7)	
Education	Illiterate (n=70)	23 (74.1)	47 (16.3)	<0.05
	Primary school (n=139)	4 (12.9)	135 (47)	
	Secondary school (n=55)	2 (6.5)	53 (18.7)	
	Above secondary (n=54)	2 (6.5)	52 (18.1)	
Occupation	Daily wage worker (n=53)	14 (45.2)	39 (13.6)	<0.05
	Homemaker (n=192)	14 (45.2)	178 (62)	
	Student (n=19)	0 (0)	19 (6.6)	
	Small scale business (n=41)	1 (3.2)	40 (13.9)	
	Salaried (n=13)	2 (6.5)	11 (3.8)	
Socioeconomic status	BG Prasad scale 1 (n=0)	0 (0)	0 (0)	>0.05
	BG Prasad scale 2 (n=18)	0 (0)	18 (6.3)	
	BG Prasad scale 3 (n=62)	5 (16.1)	57 (19.9)	
	BG Prasad scale 4 (n=163)	16 (51.6)	147 (51.2)	
	BG Prasad scale 5 (n=75)	10 (32.2)	65 (22.6)	
Locality	Rural (n=79)	5 (16.1)	74 (25.8)	>0.05
	Slum (n=165)	22 (71)	143 (49.8)	
	Urban (n=74)	4 (12.9)	70 (24.4)	

RTI=Reproductive tract infections

Table 2: Other factors affecting the prevalence of reproductive tract infections

Factors	Total number of women	RTI positive, n (%)	RTI negative, n (%)	P
Contraceptive method	Barrier method (n=83)	9 (29.9)	74 (25.3)	>0.05
	IUCD (n=48)	6 (19.4)	42 (14.6)	
	OCP (n=55)	4 (12.9)	51 (17.8)	
	Permanent method (n=42)	1 (3.2)	41 (14.3)	
	NO method (n=89)	11 (35.5)	78 (27.2)	
History of abortion	Present (n=109)	5 (16.1)	104 (36.2)	>0.05
	Absent (n=209)	26 (83.9)	183 (63.8)	
Infertility	Present (n=26)	3 (9.7)	23 (8)	>0.05
	Absent (n=292)	28 (90.3)	264 (92)	
Parity	Present (n=253)	22 (71)	231 (80.5)	>0.05
	Absent (n=65)	9 (9)	56 (19.5)	

RTI=Reproductive tract infections

Table 3: Risk factors affecting the prevalence of reproductive tract infections

Risk factor	Total number of women	RTI positive, n (%)	RTI negative, n (%)	P
Past history of RTI in women	Present (n=75)	15 (48.4)	60 (20.9)	<0.05
	Absent (n=243)	16 (51.6)	227 (79.1)	
RTI in partner	Present (n=57)	16 (51.6)	41 (14.3)	<0.05
	Absent (n=261)	15 (48.4)	246 (85.7)	

RTI=Reproductive tract infections

differences in reporting and testing methods. In our setup, women are reluctant to seek medical treatment because of the lack of privacy, shortage of the female doctors at the health facility, the cost of treatment, and their subordinate social status. RTIs have an additional element of shame and humiliation for many women because they are considered unclean. Women do not seek treatment for RTIs due to lack of

awareness, sometimes asymptomatic nature of RTIs, and lack of treatment facilities availability.

The study done by Ray *et al.* in Delhi found *Candida* infection (20.2%), bacterial vaginosis (4.1%), *T. vaginalis* (2.1%), chlamydia (1.5%), syphilis (1.1%), and gonorrhoea (0.7%) while these findings are close to the present study findings.^[23] Another

Table 4: Types of vaginal discharge

Type of discharge	n (%)
Thick, curdy, white	52 (31)
Thick, purulent, foul smelling	21 (12.5)
Thick and mucopurulent	19 (11.3)
Thick, mucopurulent, foul smelling	19 (11.3)
Thin, profuse, creamy, foul smelling	14 (8.3)
Thick and purulent	13 (7.7)
Thin, profuse, creamy	13 (7.7)
Thick, curdy, foul smelling	5 (3)
Thick, mucopurulent, mixed with blood	5 (3)
Thin, pale, foul smelling	4 (2.4)
Thin, profuse, greenish	4 (2.4)

similar study done by Balamurugan *et al.* in Karnataka reported that the majority of women were positive for candidiasis (16.01%) followed by bacterial vaginosis (12.5%), trichomoniasis (4.27%), syphilis (1.52%), and gonorrhoea 0%.^[24] The prevalence of STI in different age groups was estimated and it was maximum (51.6%) in the age group of 18–25 years because this is the most sexually active group and at a higher risk of being behaviorally more vulnerable to STI acquisition, as they generally have a higher number of sexual partners and more concurrent partnerships than the older age groups. In a study done by Shethwala and Mulla in Gujarat found the prevalence of RTI/STI 45.3% in females of <25 years of age which is close to the present study.^[25] In this study, the prevalence of RTI/STI cases observed to be significantly higher (74.2%) in illiterate women ($P < 0.05$). The prevalence of STI/RTI decreases as education level increases because educated women have good hygiene practice and use health care services much more than illiterate women. The similar results were found in a study done by Nayyar *et al.* in Delhi^[14] and Desai and Patel;^[26] where the higher prevalence was found in illiterate group of women (32.2% and 39.6%, respectively). Another study done by Hegde *et al.* in Bangalore shows that 25.7% of the study participants had never attended schools indicating the poor educational status of the study population while only 3.9% had ≥ 12 years of schooling.

The prevalence of RTI/STI is significantly higher ($P < 0.05$) in daily wage workers (45.2%) and homemakers (45.2%) as compared to who were salaried (6.5%) and doing small scale business (3.2%). According to a study done by Shethwala and Mulla, RTI/STI prevalence was 11.3% in women working outside the home and 88.7% in homemakers. In a similar study done by Hegde *et al.* found that 51% were homemakers and 24% worked as housemaids. None of the students in this study were suffering from RTI/STIs. This may be due to rare

exposure to sexual activity in students or more use of barrier contraceptives by them.

In the present study, 48.4% women had a history of RTI/STI in the past, and hence a significant association ($P = 0.001$) was observed between RTI/STI and history of such infection. However, once infected could give rise to repeated infections. This finding was similar to that reported by Kosambiya *et al.* (2009) who reported 45% women having symptoms suggestive of RTI/STI in the past.^[27] Another study done by Nayyar *et al.* found that people with a history of STI had the higher prevalence of STI as compared to the people without a history.^[14] STI/RTI was statistically significant ($P < 0.05$) higher (51.6%) in women whose partner also had symptoms suggestive of RTI/STI. This proves that RTI/STI in partner is a major risk factor.

According to the socioeconomic class, 51.6% of women belong to BG Prasad scale 4, 32.2% belonged to scale 5, and the remaining 16.1% belonged to scale 3. None of the women belonged to BG Prasad scale 1 and 2 had RTI/STI. However, the difference in the socioeconomic status of women was not found to be statistically significant. Similar study done by Majhi *et al.* found that 16.8% of girls were from class III socioeconomic class. Nearly 45.3% of girls were from class IV and 37.9% of girls were from class V which is similar to the present study findings. This might be due to awareness, knowledge, and hygiene. People belong to the lower class are not aware about these.

RTI/STI was found to be more (71%) in women who were living in slum area than the women living in rural (16.1%) and urban (18.2%) area; this could be due to poor health-seeking behavior and low education level. RTI/STI was maximum in women (35.5%) who were not using any contraceptive method this confirms the well-known fact that contraceptive methods such as condoms have a protective role in the prevention of RTI/STI. A study done by Mani *et al.* found that the prevalence of RTIs/STIs was the lowest among those who used condoms, highest in those who used Copper T, followed by those who used none of these methods.^[28]

The most common presentation was genital discharge, i.e., in 52.8% of women followed by 45.2% lower abdominal pain, 31.7% itching of genitalia, 27% burning micturition, 26.8% increase frequency of micturition, 24.2% erythema of genitalia, and 22% backache. This parallels to

the study by Shethwala and Mulla where the most common symptom of RTIs/STDs was vaginal discharge (98%) followed by lower abdominal pain (76%). According to Kamini *et al.*, vaginal discharge was the most common symptom and found in 69% of the study population which is similar to this study. According to Balamurugan *et al.*, the majority of women, i.e., 32.7% complained of abnormal vaginal discharge followed by lower backache in 31.4% and lower abdominal pain in 23.5% of women only. There was no coexistence of two types of STI reported in this study.

CONCLUSION

The prevalence of RTI/STI among the women of reproductive age group was 9.7%. The factors found to be significantly associated with RTI/STI were illiteracy ($P < 0.05$), 74.1% of illiterate women were suffering from the disease. Unemployment was associated with RTI/STI statistically significant ($P < 0.05$) as 45.2% of unemployed women were affected. Past history of RTI in patients ($P = 0.001$) and the presence of RTI in their partner ($P < 0.05$) were also significantly associated with the presence of RTI/STI. In slum women, the prevalence of RTI/STI was maximum, i.e., in 71%. RTI/STI was found to be maximum (35.5%) in women those who not using any contraceptive methods. Most common presentation of the RTI/STI was genital discharge. RTI/STI positive women had higher vaginal PH than that not having the disease ($P < 0.05$). Cervical erosion, hypertrophy of the cervix and cervical bleeding were present in all women tested positive for chlamydia. Hence, there is a need to educate women about the symptoms of RTI/STI, their prevention and the importance of timely diagnosis and treatment. Observation of the current study reinforces the importance of screening of all sexually transmitted diseases as a necessary intervention to decrease the burden of sexually transmitted diseases because the early detection and treatment of RTI/STDs can prevent complications and minimize the severity of long-term sequelae.

Limitations of the study

Limitations to the study were that only chlamydia, candidiasis, trichomoniasis, bacterial vaginosis, syphilis, and gonorrhoea were included in the study; the results could not be applied to all causes of RTI/STIs. Hence, further studies required to establish the prevalence of other RTIs/STIs.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Philip PS, Benjamin AI, Sengupta P. Prevalence of symptoms suggestive of reproductive tract infections/sexually transmitted infections in women in an urban area of Ludhiana. *Indian J Sex Transm Dis AIDS* 2013;34:83-8.
- Devi BS, Swarnalatha N. Prevalence of RTI/STI among reproductive age women (15-49 years) in urban slums of Tirupati town, Andhra Pradesh. *Health Popul Perspect Issues* 2007;30:56-70.
- Sharma S, Gupta B. The prevalence of reproductive tract infections and sexually transmitted diseases among married women in the reproductive age group in a rural area. *Indian J Community Med* 2009;34:62-4.
- Parashar A, Gupta BP, Bhardwaj AK, Sarin R. Prevalence of RTIs among women of reproductive age group in Shimla city. *Indian J Community Med* 2006;31:15-7.
- Jindal N, Aggarwal A, Gill P, Sabharwal B, Sheevani BB. Community-based study of reproductive tract infections, including sexually transmitted infections, among the rural population of Punjab, India. *Indian J Community Med* 2009;34:359-61.
- Rathore M, Vyas L, Bhardwaj AK. An analysis of prevalence of RTI in a community in Rajasthan. *Health Popul Perspect Issues* 2006;29:59-67.
- Choudhry S, Ramachandran VG, Das S, Bhattacharya SN, Mogha NS. Pattern of sexually transmitted infections and performance of syndromic management against etiological diagnosis in patients attending the sexually transmitted infection clinic of a tertiary care hospital. *Indian J Sex Transm Dis AIDS* 2010;31:104-8.
- World Health Organization. Integrating STI/RTI Care for Reproductive Health – Sexually Transmitted and Other Reproductive Tract Infections: A Guide to Essential Practice. World Health Organization; 2005.
- National AIDS Control Organization. National Guidelines on Prevention, Management and Control of Reproductive Tract Infections Including Sexually Transmitted Infections. National AIDS Control Organization; 2007.
- Cates W Jr., Rolfs RT Jr., Aral SO. Sexually transmitted diseases, pelvic inflammatory disease, and infertility: An epidemiologic update. *Epidemiol Rev* 1990;12:199-220.
- Zhang XJ, Shen Q, Wang GY, Yu YL, Sun YH, Yu GB, *et al.* Risk factors for reproductive tract infections among married women in rural areas of Anhui Province, China. *Eur J Obstet Gynecol Reprod Biol* 2009;147:187-91.
- Kamini B, Kumar DK, Epari RK, Karri V. A study on knowledge, attitude and practice of reproductive tract morbidity among women in a rural area of Tamil Nadu. *Natl J Res Community Med* 2014;3:196-204.
- Ray K, Bala M, Gupta SM, Khunger N, Puri P, Muralidhar S, *et al.* Changing trends in sexually transmitted infections at a regional STD centre in North India. *Indian J Med Res* 2006;124:559-68.
- Nayyar C, Chander R, Gupta P, Sherwal BL. Evaluation of risk factors in patients attending STI clinic in a tertiary care hospital in North India. *Indian J Sex Transm Dis AIDS* 2015;36:48-52.
- Mackie and MaCartney Practical Medical Microbiology. 14th ed., Ch. 45. New York: Churchill Livingstone Elsevier; 2012. p. 796-8.
- York MK. Paratechnical processing of specimens for aerobic bacteriology. In: Isenberg HD, Clinical Microbiology Procedures Handbook. 2nd ed. Washington, D.C: ASM Press; 2007. p.1.6-3.3.
- Larone DH. Laboratory technique. In: Medically Important Fungi. 5th ed. Washington, D.C: ASM Press; 2013; (4) p. 344-371.

18. Ministry of Health and Family Welfare. Laboratory Manual for Diagnosis of Sexually Transmitted and Reproductive Tract Infections. Government of India: National AIDS Control Organization, Ministry of Health and Family Welfare; 2014. p. 62.
19. Samanta A, Ghosh S, Mukherjee S. Prevalence and health-seeking behavior of reproductive tract infection/sexually transmitted infections symptomatics: A cross-sectional study of a rural community in the Hooghly district of west Bengal. *Indian J Public Health* 2011;55:38-41.
20. Ravi RP, Kulasekaran RA. Trends in reproductive tract infections and barriers to seeking treatment among young women: A community based cross sectional study in South India. *Am J Epidemiol Infect Dis* 2013;1:53-8.
21. Majhi P, Sulakhe R, Panda SK. Prevalence of RTI/STI symptoms among adolescent girls in an urban slum of Sambalpur. *Perspect Med Res* 2014;2:3.
22. Hegde SK, Agrawal T, Ramesh N, Sugara M, Joseph PM, Singh S, *et al.* Reproductive tract infections among women in a peri-urban under privileged area in Bangalore, India: Knowledge, prevalence, and treatment seeking behavior. *Ann Trop Med Public Health* 2013;6:215-20.
23. Ray K, Bala M, Bhattacharya M, Muralidhar S, Kumari M, Salhan S, *et al.* Prevalence of RTI/STI agents and HIV infection in symptomatic and asymptomatic women attending peripheral health set-ups in Delhi, India. *Epidemiol Infect* 2008;136:1432-40.
24. Balamurugan SS, Bendigeri N. Community-based study of reproductive tract infections among women of the reproductive age group in the urban health training centre area in Hubli, Karnataka. *Indian J Community Med* 2012;37:34-8.
25. Shethwala N, Mulla S. Study on reproductive tract infection among the female patients attending the gynecology OPD in a teaching hospitals of Gujarat- India. *Int J Med Sci Public Health* 2014;3:123-5.
26. Desai GS, Patel RM. Incidence of reproductive tract infections and sexually transmitted diseases in India: levels and differentials. *J Fam Welfare* 2011;57:48-60.
27. Kosambiya JK, Desai VK, Bhardwaj P, Chakraborty T. RTI/STI prevalence among urban and rural women of Surat: A community-based study. *Indian J Sex Transm Dis AIDS* 2009;30:89-93.
28. Mani G. Prevalence of reproductive tract infections among rural married women in Tamil Nadu, India: A community based study. *J Pioneer Med Sci* 2014;4:18-24.