

## P.C. Sen Best Paper Award

# A Cyto-Epidemiological Study on Married Women in Reproductive Age Group (15–49 Years) regarding Reproductive Tract Infection in a Rural Community of West Bengal

Shamima Yasmin<sup>1</sup>, \*Anindya Mukherjee<sup>2</sup>

<sup>1</sup>Post Graduate Trainee, <sup>2</sup>Assistant Professor, Department of Community Medicine, Medical College, Kolkata, India

### Abstract

**Background:** Reproductive tract infection (RTI) represents a major public health problem in India. Women are either not aware of the symptoms of RTI or refuse to seek health care due to economic and time constraints unless suffering from alarming symptoms. **Objectives:** To find out the prevalence of women with suggestive symptoms of RTI; to identify clinical and cytological abnormalities among the symptomatic women and to find out association between socio-demographic profile and risk factors with RTI symptomatic and cytology positive patients. **Materials and Methods:** A total of 385 married women in reproductive age group residing in Baligori sub-center area in Tarakeswar block of Hooghly district, West Bengal, India, were screened for symptom suggestive of RTI; symptomatic women went through gynecological examination and cancer cervix screening by Pap smear. Analysis of results was done by Odds ratio and multivariate logistic regression. **Results:** Overall, 23.6% of the study population had symptoms suggestive of RTI. Most of them (68.1%) had abnormal vaginal discharge. Among the symptomatic women, cytology proved that 24.4% were suffering from acute cervicitis, 4.7% from A Squamous Cell of Undetermined Significance (ASCUS) and 2.3% from Low Grade Intra epithelial Lesion (LSIL) Squamous. Statistically significant association was observed for age, number of children, contact history of husband, pond bathing, menstrual hygiene, intra uterine device insertion, non-usage of barrier method, and history of abortion among women symptomatic for RTI and asymptomatic women. **Conclusions:** Prevalence of suggestive symptoms of RTI in women was found to be high (23.6%), and among them 7% had cervical dysplasia. Therefore, enhancing awareness and organizing screening camps are absolute necessity and must be held at frequent intervals to curb the menace due to cervical cancer.

**Key words:** Bethesda classification, Cytology, Reproductive tract infection, IUD, Menstrual hygiene, Pap smear

## Introduction


Reproductive tract infection (RTI) represents a major public health problem in developing countries. More than

a million women and infants die of the complications of RTI every year.<sup>1</sup> In India women are not aware of the symptoms of RTI. Even if they know, unless the woman is suffering from alarming symptoms, they refuse to seek health care due to economic and time constraints.<sup>2</sup>

**\*Corresponding Author:** Dr. Anindya Mukherjee, Assistant Professor, Department of Community Medicine, Calcutta Medical College, EE-153/5, Sector II, Salt Lake, Kolkata - 700 091, India.  
E-mail: [anindyamukherjee2007@rediffmail.com](mailto:anindyamukherjee2007@rediffmail.com)

RTI has become a silent epidemic that devastates women's lives.<sup>1</sup> These include postabortal and puerperal sepsis, ectopic pregnancy, fetal and perinatal death, and infertility; it also increases the risk of acquiring and transmitting human immunodeficiency virus (HIV) infection, chronic lower abdominal pain, emotional distress social rejection of women and cervical cancer. Some of the RTIs act as precursors for cancer cervix as reported in different studies, and thus may require prompt treatment.<sup>3</sup>

Cancer of the uterine cervix is the second most common cancer among women world-wide and in India it is

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the most common cancer among women. One out of every five women in the world suffering from this disease belong to India.<sup>3</sup> More than three-fourths of these patients are diagnosed at advanced stages leading to poor prospects of long-term survival and cure.<sup>4</sup> In our country, where the risk factors of cancer cervix are prevailing, such as early marriage, early conception, multiparity, and low socio-economic condition, cervical cancer can be prevented by screening women systematically through organized population-based programs. In India, despite the public health importance that cervical cancer merits, there are only sporadic efforts in hospitals and research settings. Regular population-based screening using Pap smear cytology is the internationally accepted screening method for cervical cancer. The health infrastructure and organizational aspects for such a screening program, based purely on the Pap smear are not available in India at present due to lack of trained personnel and laboratory facilities. The United States Preventive Services Task Force (USPSTF) has recommended regular screening of women to decrease load of cancer cervix morbidity.<sup>5</sup> With the above-mentioned background, the present study was undertaken with the objectives to find out the prevalence of suggestive symptoms of RTI among the married women of 15-49 years, to identify clinical and cytological abnormalities among the symptomatic women, and to find out association between socio-demographic profile and risk factors with RTI symptomatic and cytology-positive patients.

## Materials and Methods

The present study was an observational, descriptive, epidemiological study with cross-sectional, community-based design conducted at Baligori sub-center area, Tarakeswar block of Hooghly district, West Bengal, India, which was also the rural field practice area of Department of Community Medicine, Medical College, Kolkata. The inclusion criteria of the study population consisted of ever-married women residing permanently ( $\geq 5$  years) in the study area. The exclusion criteria were pregnant women, women within 6 weeks following delivery or abortion, women with already detected cancer cervix revealed from history or records, and women refusing consent. Study period was from July 1, 2010 to December 31, 2010, that is, 6 months.

Sample design was based on a study conducted in a rural area of India in 2009, which showed that the prevalence of symptoms for RTI was 51.9%<sup>6</sup> among ever-married women of reproductive age group. Applying formula

$n = 4pq/L^2$ , taking allowable error of 10% and doing finite correction for population as ( $N$ ) 6512, and taking 10% nonresponse rate, the final sample size came out to be 385.

Study tools were predesigned, pretested proforma, Cusco or Sim's speculum, Ayre's spatula, Koplik's jar, glass slides, ethyl alcohol, and gloves. Pap stain microscopy was performed with the assistance of Institute of Serology, Kolkata. The study techniques were interview, clinical examination, gynecological examination, taking of Pap smear from the symptomatic women, and laboratory examination of the smear.

Ethical clearance was sought from ethical committee, Medical College Kolkata. A block level meeting was organized with Block Medical Officer of Health (BMOH), Medical officer of Tarakeswar rural hospital, Block Public Health Nurse (BPHN), Public Health nurse (PHN), Reorientation of Medical Education (ROME) medical officer, Multipurpose Health Worker (MPHW), and other village level workers.

The purpose, objective, utility, and methodology of the study were explained to them in detail, especially the operational issues. With help of them, IEC activities regarding RTI, cancer cervix were conducted in the study area to generate awareness regarding cancer cervix and importance of screening. In the study area, first house was selected by a random start and each consecutive house was visited until the sample size was reached. The study population was interviewed with predesigned and pretested proforma to assess their socio-demographic characteristics and for presence of symptoms suggestive of RTI, that is, excessive white discharge; foul smelling itchy discharge; chronic lower abdominal pain; any ulcer, swelling, irritation around vaginal area; any other gynecological abnormality, etc. Symptomatic patients were requested to attend Tarakeswar Rural Hospital (RH) on a prefixed date and time.

In total, 91 symptomatic women were asked to attend Tarakeswar RH. Of these, 86 women attended for clinical examination. Written consent was obtained, general and speculum examination was performed, and then Pap smear was obtained by aseptic technique from the squamo-columnar junction using an Ayre spatula. Smears were being fixed in 1:1 ethyl alcohol and were given to a pathologist of the Institute of Serology for staining by Papanicolaou technique and reporting. The screening results were shared with the participants with complete

explanation of positive and negative results. Those requiring further investigation or management were referred to Tarakeswar RH and Hooghly district Hospital.

The data were tabulated in MS Excel 2007 software and analyzed for simple proportions; Test of significance and logistic regression were performed. For statistical analysis, Epi info 3.5.1 and SPSS 16.0 softwares were used.

## Results

Of the total 385 married women screened, 91 women (23.6%) had suggestive symptoms of RTI. Majority of them, that is, 62 (68.1%) had history of abnormal vaginal discharge and 46 women (50.5%) had history of chronic lower abdominal pain. Of the 91 symptomatic women, 86 had come for examination in the rural hospital with a response rate of 94.5%.

Of the 385 study participants, majority, that is, 264 (68.6%) belonged to the age group of 20–30 years; 248 (64.4%) were literate; 314 (81.5%) belonged to joint families; 162 (42.1%) had three or more children; 347 (90.1%) were homemakers; 50.2% belonged to higher socio-economic classes, that is, classes I, II, and III of Prasad's modified socio-economic scale 2004, and 317 (82.3%) were Hindus. Women of 20–30 year age group, illiterate, belonging to nuclear family, having higher number of children, being homemaker, higher socio-economic status, and belonging to Hindu religion were proportionately more symptomatic. Association with age and number of children was found to be statistically significant. It was found that 249 (64.7%) of the study population were married below 18 years of age; 241 (62.6%) had teenage pregnancy; 74 (19.2%) had history of pond bathing; and 337 (87.5%) had improper menstrual hygiene, that is, used old washed cloth. Regarding contraceptive use for past 1 year, 29 (7.5%) used barrier method as contraceptive; 10 (2.5%) had copper T inserted; 62 (16.1%) had history of oral contraceptive pills (OCP) usage. In total, 105, that is, 27.2% of the study population, had a history of abortion in the past 5 years, and 19 (4.9%) reported contact history of husband with partner/s other than wife. Women with lower age of marriage, teenage pregnancy, history of pond bathing, poor menstrual hygiene, and nonusage of barrier or OCP, *in situ* intra uterine device (IUD), history of abortion and positive contact history were proportionately more symptomatic. Barring age of marriage and conception all other attributes were significantly associated with being symptomatic for RTI [Table 1].

**Table 1: Distribution of study population according to socio-demographic variables, risk factors of RTI, and symptomatic for RTI (n = 385)**

Variables	Symptomatic	Asymptomatic	Statistical tests
<b>Age</b>			
20–30 (n = 264)	82 (31.1)	182 (68.9)	OR = 5.6 [2.7–11.6] P = 0.000
31–49 (n = 121)	9 (7.4)	112 (92.6)	
<b>Education of wife</b>			
Literate (n = 248)	57 (23)	191 (77)	OR = 1.1 [0.68–1.8] P = 0.68
Illiterate (n = 137)	34 (24.8)	103 (75.2)	
<b>Family</b>			
Nuclear (n = 71)	17 (23.9)	54.76.1	OR = 0.98 [0.5–1.79] P = 0.95
Joint (n = 314)	74 (23.6)	240 (76.4)	
<b>No. of children</b>			
<3 (n = 223)	41 (18.4)	182 (81.6)	OR = 1.98 [1.23–3.18] P = 0.004
≥3 (n = 162)	50 (30.9)	112 (69.1)	
<b>Occupation of wife</b>			
Homemaker (n = 347)	83 (23.9)	264 (76.1)	OR = 0.84 [0.37–1.9] P = 0.69
Working (n = 38)	8 (21.1)	30 (78.9)	
<b>Socio-economic status</b>			
1 = 1,2,3 (n = 193)	50 (25.9)	143 (74.1)	OR = 0.77 [0.48–1.24] P = 0.29
2 = 4,5,6 (n = 192)	41 (21.4)	151 (78.6)	
<b>Religion</b>			
Hindu (n = 317)	76 (24)	241 (76)	OR = 0.89 [0.47–1.68] P = 0.73
Muslim (n = 68)	15 (22.1)	53 (77.9)	
<b>Age of conception</b>			
<19 (n = 241)	57 (23.7)	184 (76.3)	OR = 0.99 [0.6–1.6] P = 0.99
≥19 (n = 144)	34 (23.6)	110 (76.4)	
<b>Age of marriage</b>			
<18 (n = 249)	59 (23.7)	190 (76.3)	OR = 0.99 [0.6–1.6] P = 0.97
≥18 (n = 136)	32 (23.5)	104 (76.5)	
<b>Pond bathing</b>			
No (n = 311)	44 (14.1)	267 (85.9)	OR = 36.21 [17.03–76.99] P = 0.000
Yes (n = 74)	47 (63.5)	27 (36.5)	
<b>Menstrual hygiene</b>			
1 = No (n = 48)	1 (2.1)	47 (97.9)	OR = 17.12 [2.3–125.9] P = 0.000
2 = Yes (n = 337)	90 (26.7)	247 (73.3)	
<b>Use of barrier method</b>			
Yes (n = 29)	2 (6.9)	27 (93.1)	OR = 4.5 [1.05–19.3] P = 0.03
No (n = 356)	89 (25)	267 (75)	
<b>H/O IUD insertion</b>			
No (n = 375)	84 (22.4)	291 (77.6)	OR = 8.06 [2.04–31.94] P = 0.000
Yes (n = 10)	7 (70)	3 (30)	
<b>OCP use</b>			
Yes (n = 62)	10 (16.1)	52 (83.9)	OR = 1.74 [0.84–3.5] P = 0.12
No (n = 323)	81 (25.1)	242 (74.9)	
<b>H/O abortion</b>			
Not done (n = 280)	52 (18.6)	228 (81.4)	OR = 2.59 [1.57–4.26] P = 0.000
Done (n = 105)	39 (37.1)	66 (62.9)	
<b>Contact H/O husband</b>			
No (n = 366)	76 (20.8)	290 (79.2)	OR = 14.3 [4.6–44.38] P = 0.001
Yes (n = 19)	15 (78.9)	4 (21.1)	

Multivariate logistic regression analysis with the attributes found to be statistically significant by univariate analysis in Table 1 shows that age group 20–30 years, three or more number of children, history of pond bathing, poor menstrual hygiene, and contact history of husband were found to be statistically significant [Table 2].

Table 3 shows that on speculum examination, cervical discharge was seen in 34 (39.5%), and erosion in 18 (20.9%), whereas Pap smear examination revealed dysplasia in 6 (7%) and acute cervicitis in 21 (24.4%) of the respondents.

Among the symptomatic women tested for cytology, it was revealed that cytology positives (acute cervicitis or cervical dysplasia including LSIL and ASCUS of Bethesda classification) were higher in the age group 31–49 years, those having three or more children, non-usage of barrier, history of pond bathing, poor

menstrual hygiene, *in situ* IUD, history of abortion in the past 5 years, and positive contact history of husband. Statistically significant associations were observed for increased number of children, menstrual hygiene, pond bathing, and contact history of husband [Table 4].

## Discussion

The present study revealed that prevalence of the suggestive symptoms of RTI among married women was 23.6%. There was varied prevalence of RTI as reported by researchers among rural and urban Indian women. It was 49% in a rural district of Agra (U.P.),<sup>7</sup> whereas 70% in rural area of Haryana.<sup>8</sup> Comparatively, low prevalence was observed in the slum and rural areas of Chandigarh (21.6% and 17.7%, respectively).<sup>9,10</sup> Samanta *et al.*<sup>11</sup> reported a lower prevalence of 13.5% in the rural area of Hooghly district of West Bengal, whereas in a similar study conducted in Kolkata by Dasgupta *et al.*,<sup>2</sup> 43.3% had suggestive symptoms of RTI. Prevalence was more

**Table 2: Logistic regression analysis of the attributes found to be significantly associated with being symptomatic as in univariate analysis in Table 1**

Attributes	B	SE	Df	Sig.	Exp(B)
Age	1.830	0.473	1	0.000	6.232
No. of children	-0.063	0.358	1	0.861	0.939
Abortion	1.168	0.371	1	0.002	3.215
IUCD	0.949	0.957	1	0.321	2.584
Barrier	0.542	0.789	1	0.492	1.719
Contact history of husband	1.544	0.784	1	0.049	4.673
Pond bathing	2.344	0.450	1	0.000	10.426
Menstrual hygiene	2.922	0.456	1	0.000	18.583
Constant	-16.009	2.336	1	0.000	0.000

2 log likelihood ratio = 227.6; Cox and Snell R<sup>2</sup> = 0.395. Age 20–30 years, no. of children 3 or more, H/O abortion, H/O IUD usage, H/O nonusage of barrier, positive contact history of husband, H/O pond bathing, and poor menstrual hygiene shown in the table. The corresponding complementary attributes are kept as standard = 1

**Table 3: Distribution of RTI symptomatic women according to their clinical and cytological findings (n = 86)**

Type of examination/classification	No.	%
Speculum examination		
Normal	44	51.2
White discharge	24	27.9
Erosion	8	9.3
Both	10	11.6
Bethesda system		
Normal	80	93.0
ASCUS	4	4.7
LSIL	2	2.3
Benign inflammatory lesion		
Normal	65	75.6
Acute cervicitis	21	24.4

**Table 4: Distribution of the symptomatic according to socio-demographic and risk factors with cytology results (n = 86)**

Variables	Cytology negative	Cytology positive	Statistical tests
Age			
20-30 (n = 81)	56 (69.1)	25 (30.9)	OR = 1.78 [0.19–16.79]
31-49 (n = 5)	4 (80)	1 (20)	P = 0.60
No. of children			
<3 (n = 38)	32 (84.2)	6 (15.8)	OR = 3.1 [1.13–8.4]
≥3 (n = 48)	28 (58.3)	20 (41.7)	P = 0.009
Use of barrier			
Yes (n = 1)	0 (0.0)	1 (100)	χ <sup>2</sup> * = 0.18
No (n = 85)	60 (70.6)	25 (29.4)	Df = 1, P = 0.66
Contact H/O husband			
No (n = 71)	56 (78.9)	15 (21.1)	OR = 10.2 [2.8–36.6]
Yes (n = 15)	4 (26.7)	11 (73.3)	P = 0.000
IUD			
No (n = 79)	54 (68.4)	25 (31.6)	OR = 0.36 [0.04–3.15]
Yes (n = 7)	6 (85.7)	1 (14.3)	P = 0.059
Menstrual hygiene			
Not using cloth (n = 36)	19 (52.8)	17 (47.2)	OR = 0.24 [0.09–0.64]
Using cloth (n = 50)	41 (82)	9 (18)	P = 0.0036
Abortion			
Not done (n = 51)	35 (68.6)	16 (31.4)	OR = 0.87 [0.34–2.24]
Done (n = 35)	25 (71.4)	10 (28.6)	P = 0.78
OCP			
Yes (n = 10)	3 (70)	7 (30)	OR = 1.01 [0.24–4.3]
No (n = 76)	23 (30.3)	53 (69.7)	P = 0.98
Pond bathing			
No (n = 39)	32 (82.1)	7 (17.9)	OR = 3.8 [1.34–10.81]
Yes (n = 47)	28 (59.6)	19 (40.4)	P = 0.02

among illiterates and was less among the working women contrary to the findings of the present study. Latha *et al.*<sup>12</sup> in a multicentric study in rural West Bengal, Gujarat, urban Baroda, and Mumbai reported the prevalence of RTI, ranging from 19% to 71%. The prevalence of RTI among women in the reproductive age group in Shimla<sup>13</sup> town was found to be 36.3%, whereas it was 59.8% in the field area of a tertiary medical college in New Delhi.<sup>14</sup>

In the present study, most common symptom was abnormal vaginal discharge, which corroborated with the findings of several studies.<sup>2,11,14</sup>

In the present research, age group of 20–30 years and higher parity, pond bathing, improper menstrual hygiene, history of abortion, contact history of husband, and usage of IUD were found to be significantly associated with being symptomatic for RTI. Usage of barrier method was found to be protective.

Dasgupta *et al.*<sup>2</sup> found that Muslims, illiterates, and housewives were significantly affected by RTI contrary to the findings of the present study, which found no statistical association for those attributes. However, observations like significant association of RTI with more number of children or more number of abortions and protective effect of barrier methods as reported by Dasgupta *et al.*<sup>2</sup> corroborated with the present study. Sharma *et al.*<sup>14</sup> reported significant association of RTI with higher parity and poor genital hygiene, which corroborated with our findings, although role of literacy as significant risk factor as reported by them was not established in the present research.

In the present study, of the 86 symptomatic women reported for clinical and cytological examinations, 48.8% were found to be suffering from white discharge/erosion or both as per speculum examination; according to Bethesda system, 4 (4.7%) and 2 (2.3%) were ASCUS- and LSIL-positive, respectively. Benign inflammatory lesion was documented in 21 (24.4%) patients. Altogether, 26 patients were cytology-positive (30.2%). In another similar study,<sup>14</sup> of the 214 Pap smear collected, 41.1% showed benign inflammatory changes, 4.67% showed carcinoma *in situ*, and 1.4% showed high-grade malignancy.

In the present study, symptomatic cytology-positive patients had significantly higher number of child-bearing, poorer menstrual hygiene, contact history of husband,

and history of pond bathing. The estimated relative risk for cancer cervix among women getting married before 17 years of age has been reported to be 7.9 in a study conducted by Dutta.<sup>15</sup> In the same study, the prevalence of carcinoma *in situ* and high-grade cervical carcinoma was found to be 10.7% among women with high parity (more than three children).

## Conclusion

In the present study, all the symptoms were recorded based on recall, subjected to bias or conscious falsification and not all of the patients were tested with clinical examination or cytology due to resource constraints. However, the study was able to find out certain highlighting points like: It is necessary to increase awareness among women regarding the symptoms and consequences of RTI and cancer cervix, and particular attention should be given to appropriate education and counseling for use of condoms, avoidance of multiple sexual partners, appropriate age at marriage, and maintenance of personal hygiene. Carcinoma *in situ* is the stage that could be reversed by early treatment, and mortality due to high-grade carcinoma thus could be reduced to a considerable extent as has been observed by others. Thus, such types of screening camps and programs must be held more frequently to curb the menace due to cervical cancer.

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