

Socio-Demographic, Clinical, and Hygiene Profile of Syndromically Managed Sexually Transmitted Diseases: A Cross Sectional Study in a Tertiary Care Center in India

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Abstract

Background: Sexually transmitted diseases are one of the several major public health concerns, the burden of which is borne by low- and middle-income countries like India. **Purpose:** The purpose is to evaluate the relationship between menstrual and sanitary hygiene and sexually transmitted diseases (STD) based on syndromic diagnosis **Methods:** An out-patient department (OPD) based cross sectional survey to determine these associations, if any exist, which would help critically analyze syndromic management. STD was reported by the presence of vaginal/cervical/urethral discharge with or without irritation and itching, lower abdominal pain and ulcer. **Results:** The prevalence of STD was 66.84% with the most commonly reported symptoms being discharged (31.18%), followed by abdominal pain (17.92%) and itching/irritation (12.90%), with ulcer (4.83%) being the least reported symptom. Perimenopausal age ((AOR: 0.420 [CI: 0.189 - 0.915]; p = 0.030), higher grades of education ((AOR: 0.228 [CI: 0.119 - 0.424]; p < 0.001) for secondary), urban residency (AOR: 0.435 [CI: 0.686 - 2.733]; p < 0.001), and contraception use (AOR: 0.531 [CI: 0.308 - 0.887]; p = 0.018) were associated with lesser odds of presenting with an STD symptom. Belonging to a minority religious community (AOR: 7.20 [CI: 1.866 - 48.251]; p < 0.012) or backward castes (AOR: 3.753 [CI: 1.587 - 10.144]; p < 0.001), having similar illness (AOR: 4.205 [CI: 2.795 - 6.439]; p < 0.001) or having an invasive gynecological procedure done in the past one year (AOR: 1.953 [CI: 1.184 - 3.295]; p = 0.010) and washing the reusable sanitary material only with water (AOR: 4.900 [CI: 2.701 - 9.116]; p < 0.001) as compared to washing it with water and soap, had a higher association with presenting with STD symptoms. Stratified analysis also showed that women presenting discharge (AOR: 2.049 [CI: 1.343

- 3.146] for vaginal and cervical; AOR: 1.426 [CI: 0.826 - 2.482] for urethral) were more likely to not have a toilet facility in an accessible condition. Women with sanitary napkin use had lesser odds (AOR: 0.780 [CI: 0.516 - 1.180]; $p = 0.293$) of presentation for STD in OPD than women who used other material. **Conclusion:** To better manage the group of diseases that may present with symptoms of STD under syndromic approach, we propose interventions such as menstrual hygiene education and promotion of the use of sanitary napkins among women especially those belonging to lower socio-economic sections of the society.

Keywords

Sexually Transmitted Diseases, Menstrual Hygiene, Socio-Demographics, Sexually Transmitted Infections, Reproductive Tract Infections, Syndromic Management

1. Introduction

Globally, sexually transmitted diseases (STD) have a significant burden on sexual and reproductive health with profound morbidity and mortality. As per the WHO report in 2016, globally there is a 1 million sexually transmitted infections (STIs) are acquired with estimated new cases of 376 million every year [1]. The STI burden varies according to the region and gender and the prevalence is higher in resource-poor countries. The STI is one of the vital public health problems in India and nearly 6% of the adult population had one or more STI, with an annual incidence of around 30 - 35 million episodes [2].

Adverse complication of curable STIs or STD encompasses pelvic inflammatory disease, infertility, ectopic pregnancy, pregnancy loss, stillbirth, premature rupture of membranes, premature delivery and increased risk of HIV development and transmission and the neonatal outcome includes low birth weight, respiratory depression and increased neonatal ICU admission premature labor and low birth weight [3]. The three major causative pathogens in the progression of curable genital STI are *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and *Trichomonas vaginalis* and they are usually asymptomatic and more commonly observed in females [4].

Due to the lack of skilled healthcare workers at the healthcare facilities and also there is a delay in early diagnosis as a result of expensive and sophisticated instruments which is not available in low-resource settings. So, there is a high chance of misdiagnoses and the infections are not properly treated. In this scenario, the chance of diagnosis is reduced to 50% and there is a high risk of transmitting the infection and the complications will still remain forever. Thus, the above factors lead to the development of syndromic management. The National AIDS Control Organization (NACO) describes 7 STI syndromes in Women. They are: urethral discharge, cervical discharge, vaginal discharge, ge-

nital ulcer-non-herpetic, genital ulcer-herpetic lower abdominal pain and inguinal bubo [5].

Previous studies conducted in Pakistan and Namibia report that there is a lack of knowledge among healthcare workers in the syndromic management of STI [6] [7]. In addition, further studies conducted in Pakistan and six countries in West Africa showed decreased knowledge in syndromic management of STI [8] [9]. In another study conducted in Nepal, there is a low level of knowledge among healthcare workers during the management of STI/HIV [10].

Primary care providers orchestrate an important role in the management of STD since various patients with STD are asymptomatic and the infections are diagnosed during their visits in primary care setting. Previous study reports that nearly half of the diagnosed STD is from primary care clinics and nearly 80% of the STD cases are reported from non-STD clinics [11] [12].

The wide approach to STD/STI also includes some symptoms that may be related to maintenance of menstrual hygiene and adequate wash practices. Our study aimed to find such association, if any, and derive meaningful conclusions as recommendations to improve the syndromic management approach.

2. Materials and Methods

This was a cross sectional, observational study conducted in the Obstetrics and Gynecology outpatient department of Civil Hospital, Ahmadabad. Asarwa civil hospital in Ahmedabad is a government hospital tending to needs of the urban and rural population of Ahmedabad district, other parts of Gujarat and referred cases from parts of Rajasthan, Madhya Pradesh and Maharashtra. Our study population covers a broad spectrum of socio-demographic statuses. The patient recruitment was done from February 2019 to June 2019 (20 weeks). We recruited women visiting the gynecology section of the department by consecutive sampling.

Non-pregnant women of reproductive age (18 years and above) attending the OPD with vaginal symptoms (vaginal discharge, itching/irritation/burning, ulcer and lower abdominal pain) were included in the study. Pregnant women, puerperal women and repeating patients were excluded from the study.

2.1. Sample Size Calculation

A single proportion sample size estimation formula was used with the following assumptions was used:

$$n = \left[\frac{(Z_{\alpha/2})^2 * p(1-p)}{d^2} \right]$$

$Z_{\alpha/2}$ is the standard normal variable value at 95% CI (confidence interval) (α is 0.05 with 95%CI, $Z_{\alpha/2} = 1.96$; an estimate of the prevalence (p) of RTI 50%, and 5% the margin of error (d). A design effect of 1.5 was used due to multistage sampling and a sample size correction formula was employed since the source population was less than 10,000 in the study area. A 10% non-response rate was

used to obtain 602 as an adequate sample size.

2.2. Data Collection

After identification by the treating physician based on syndromic approach of STD management, all potential study participants underwent an informed consent process in the local language (Gujarati or Hindi) and those choosing to participate provided written consent. Female surveyors administered a comprehensive pre-tested (for validity and reliability) questionnaire immediately after their visit with the attending physician and through it examined risk factors.

The questionnaire was designed by the primary investigators of the study and consists of risk factors in groups of socio-economic characteristics, menstrual hygiene practices and accessibility and usability of toilets for maintaining menstrual hygiene, clinical history and sexual history of subjects. A similar framework was already used by the authors in other related work, as it captures aspects of the working definition of Menstrual hygiene management (MHM) by the Joint Monitoring Program of the WHO and UNICEF in 2012 (defining MHM as: Women and adolescent girls using a clean menstrual management material to absorb blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for washing the body as required and having access to facilities to dispose the used menstrual management materials) and also other important risk factors related to the STI identified in the literature.

2.3 Statistical Analysis

The data were coded, entered into Microsoft excel 2019, and exported to R statistical analysis software version 4.0.2 used with interface R studio software for analysis. Descriptive statistics such as frequency distribution and prevalence were computed. Associations between independent variables and STI were determined using a binary logistic regression model.

3. Results

Among the 603 patients who visited the gynecology OPD of the hospital during the study period, 558 were enrolled in the study, 13 patients were not willing to participate in the study and 32 patients were excluded from the study.

3.1. Socio-Demographic Characteristics

The demographic characteristics of the patients were shown in **Table 1**. Majority of the patients (67.56%), were in the age group between 20 - 40 years and the mean age was 32.13 ± 4.68 years. Majority of them were married women (73.66%), followed by unmarried (19.71%), divorced (5.20%) and widowed women (1.43%). The majority of women were literate (80.82%), Hindu women (62.16%), belonging to open (66.78%) category of caste-based reservation system, living in a nuclear family (53.41%) working as household help or homemaker

Table 1. Socio-demographic characteristics of the study participants.

Variables	Frequency n (%)	STI		COR (95%CI)	p-value
		Yes n	No n		
Age in years					
Less than 20 years	66 (11.83%)	47	19	1	
20 - 40 years	377 (67.56%)	266	111	2.21 (1.15 - 4.29)	0.01*
More than 40 years	115 (20.61%)	60	55	1.01 (0.56 - 1.82)	0.9723
Marital status					
Single	110 (19.71%)	73	37	1.52 (0.28 - 8.170)	0.618
Married	411 (73.66%)	269	142	1.58 (0.31 - 8.21)	0.576
Divorced	29 (5.20%)	25	4	0.48 (0.06 - 3.39)	0.453
Widowed	8 (1.43%)	6	2	1	
Religion					
Hindu	345 (62.16%)	237	108	1	
Muslim	179 (32.25%)	104	75	0.631 (0.434 - 0.919)	0.016*
Others	31 (5.59%)	29	2	6.607 (1.943 - 4.134)	0.011*
Educational status					
Illiterate	107 (19.18%)	84	23	1	
Primary	176 (31.54%)	107	69	1.235 (0.13 - 1.413)	0.002*
Secondary	164 (29.39%)	87	77	0.323 (0.184 - 0.568)	<0.001*
Higher secondary	95 (17.02%)	81	14	0.631 (0.299 - 1.331)	0.217
Above that	16 (2.87%)	14	2	0.521 (0.107 - 2.541)	0.411
Residence					
Rural	169 (30.29%)	94	75	1	
Urban	389 (69.71%)	279	110	0.494 (0.107 - 2.542)	<0.001*
Occupation					
Homemaker/Housemaker	353 (63.37%)	237	116	1	
Laborer	89 (15.98%)	53	36	1.387 (0.85 - 2.26)	0.179
Other	115 (20.65%)	82	33	0.822 (0.513 - 1.316)	0.405
Income of self					
Less than Rs.5000 per month	356 (63.80%)	227	129	1	
More than Rs.5000 per month	202 (36.20%)	146	56	0.675 (0.459 - 0.991)	0.041*
Family status					
Nuclear	298 (53.41%)	193	105	1	
Joint	160 (28.67%)	126	34	0.495 (0.314 - 0.783)	0.002*

Continued

Others	100 (17.92%)	54	46	1.566 (0.979 - 2.502)	0.0558
Caste					
Open	372 (66.78%)	239	133	1	
SC/ST/OBC	125 (22.44%)	80	45	(0.103 - 0.546)	<0.001*
Others	60 (10.77%)	53	7	0.237	0.960

1: Reference category. Illiterate stands for not having attended both formal and informal education, primary education means Grade 1 - 8; secondary education means Grade 9 - 10, higher secondary means Grade = 10 - 12, and graduate education means having acquired a diploma, degree, masters and others.

(63.37%) earning less than 5000 per month (63.80%). The categories of housewife and household help were taken together in occupation as the objective of study was accessibility of an inhouse toilet or separate space dedicated to maintenance of hygiene.

The prevalence of sexually transmitted disease on basis of syndromic approach among reproductive-age women was 66.84% [CI: 62.76 - 70.74]. The most commonly reported symptoms were vaginal/cervical discharge (31.18%), followed by abdominal pain (17.92%) and urethral discharge/irritation/itching (12.90%) and ulcer (4.83%). The symptoms which were not considered as STD according to syndromic approach included gynecological symptoms like pain or discomfort during intercourse, bleeding between periods, frequent and urgent need to urinate, or a burning sensation during urination, abnormal vaginal bleeding, particularly during or after intercourse, pain or pressure in pelvis that differs from menstrual cramps etc. They were present in 33.15% of the patients.

3.2. Availability and Usage of Toilet

Among the patients recruited in the study, a clean, isolated, toilet facility with presence of water was available to 48.38%. No significant association of this parameter was obtained with chief complain of STD according to syndromic management, however stratified analysis of each of the complaints showed that there were higher odds of not having access to such a facility among women presenting with discharge (COR: 2.049 [CI: 1.343 - 3.146]; $p < 0.001$) and itching/irritation (COR: 1.426 [CI: 0.826 - 2.482]; $p = 0.204$). The results are shown in **Table 2**.

3.3. Past Clinical History

In our study, 79.75% women reported not having an invasive gynecological procedure (like abortion/dilation and curettage etc.) in the past 1 year. However, those who had undergone a procedure showed higher odds (COR-1.655 [CI: 1.046 - 2.683]; $p = 0.035$) of reporting an STD symptom as compared to reporting other symptoms. A positive history of similar illness was reported by 55.91% participants. Patients with STD symptoms were thrice as likely as other patients to have experienced similar illness (COR: 3.358 [CI: 2.291 - 4.988]; $p < 0.001$).

Among participants, 80.107% did not report per vaginal exam done in the last year and 68.41% of married women living with their husbands, denied concomitant presence of STD symptoms in their partners. The results were shown in **Table 3**.

Table 2. Availability and usage of toilet among study participants.

Variables	Frequency n (%)	STI		COR (95%CI)	p-value
		Yes n	No n		
Availability and usage of toilet					
Used	270 (48.38%)	174	96	1	
Unused	288 (51.61%)	199	89	1.234 (0.867 - 1.757)	0.244
Frequency of chief complain		Availability and usage of toilet		COR (95%CI)	p-value
		Used	Unused		
Vaginal/Cervical Discharge	174 (31.18%)	60	114	2.049 (1.343 - 3.146)	<0.001*
Abdominal pain	100 (17.92%)	68	32	0.507 (0.302 - 0.839)	<0.009*
Ulcer	27 (4.83%)	15	12	0.863 (0.376 - 1.940)	0.722
Urethral discharge/itching/irritation	72 (12.90%)	31	41	1.426 (0.826 - 2.482)	0.204
Other chief complain- not related to RTI	185 (33.15%)	96	89	1	

1: Reference category.

Table 3. Obstetrics and Gynecological history among the study population

Variables	Frequency n (%)	STI		COR (95%CI)	p-value
		Yes n	No n		
History of abortion/D and C/Other invasive procedures in year prior to data collection					
Yes	113 (20.25%)	85	28	1.655 (1.046 - 2.683)	0.035*
No	445 (79.75%)	288	157	1	
History of similar symptoms in year prior data collection					
Yes	246 (44.08%)	199	47	3.358 (2.291 - 4.988)	<0.001*
No	312 (55.91%)	174	138	1	
Per Vaginal exam in the past year					
Yes	111 (19.892%)	75	36	1.012 (0.679 - 1.310)	0.798
No	447 (80.107%)	286	161	1	
Husband's illness of reproductive tract		Multiple sexual partners		COR (95%CI)	p-value
		Yes	No		
Yes	145 (31.59%)	80	28	0.752 (0.499 - 1.778)	0.166
No	314 (68.41%)	21	429	1	

1: Reference category.

3.4. Behavioral Factors

The majority (91.22%) of the study participants did not have multiple sexual partners during the previous year. The bivariate analysis showed that those respondents who had multiple sexual partners were at a higher risk for developing STD (COR: 1.136 [CI: 0.613 - 2.202]; $p = 0.692$) compared to those who did not have multiple partners. Majority of women reported having their first experience of sexual intercourse during ages 25 - 35 years (59.35%). The odds of presenting with an STD complain were significantly higher (three times) in women who had experienced sexual intercourse than those who had not. The women who had their first sexual intercourse at ages between 25 and 35 years had the highest odds of presenting with an STD (COR: 2.883 [CI: 1.754 - 4.762]; $p < 0.001$). The use of contraception, though seen only in 19.35% of women was significantly associated with having lesser odds of presenting with STD symptoms (COR: 0.546 [CI: 0.332 - 0.897]; $p = 0.0149$). The results were shown in **Table 4**.

3.5. Menstrual Hygiene Management (MHM) and Washing Practices

Unfortunately, the majority of women recruited in the study did not use sanitary napkins (66.13%). Out of all women, 31.69% denied re-using their menstrual absorbent material. 28.69% of women reused the material and changed the material twice a day, followed by once a day (26.23%) and more than twice a day (13.38%). However, 61.44% participants used only water to wash it. The use of sanitary napkins had lesser odds (COR: 0.742 [CI: 0.510 - 0.981]; $p = 0.041$) of presenting with STD symptoms in the OPD. As the frequency of washing increased, the odds of presenting with STD complain decreased. For those reusing

Table 4. Characteristics of behavioral factors among study participants.

Variables	Frequency <i>n</i> (%)	STI		COR (95%CI)	p-value
		Yes <i>n</i>	No <i>n</i>		
Multiple sexual partners during the last year					
Yes	49 (8.78%)	34	15	1.136 (0.613 - 2.202)	0.692
No	509 (91.22%)	339	170	1	
Age at first sexual intercourse					
Not yet	81 (14.56%)	38	43	1	
Less than 25 years	106 (19.06%)	70	36	2.200 (1.220 - 4.007)	<0.001*
25 - 35 years	330 (59.35%)	227	103	2.883 (1.754 - 4.762)	<0.001*
More than 35 years	39 (7.01%)	21	18	2.880 (1.292 - 6.770)	0.011*
Use of any kind of contraception					
Yes	108 (19.35%)	83	25	0.546 (0.332 - 0.897)	0.0149*
No	450 (80.64%)	290	160	1	

1: Reference category.

Table 5. Menstrual hygiene management (MHM) practices among reproductive age women.

Variables	Frequency <i>n</i> (%)	STI		COR (95%CI)	p-value
		Yes <i>n</i>	No <i>n</i>		
Nature of absorbent material used during menstruation					
Cloth/cotton equivalent	369 (66.13%)	255	114	1	0.749
Sterile sanitary pad/napkin	189 (33.87%)	118	71	0.742 (0.510-0.981)	0.041*
Frequency of washing the material					
I do not wash it as I do not reuse it	116 (31.69%)	69	47	1	
Once per day	96 (26.23%)	21	75	2.430 (1.339-4.505)	0.004*
2 times per day	105 (28.69%)	74	29	1.736 (0.940-2.45)	0.054
More than 2 times per day	49 (13.38%)	34	15	1.542 (0.759-3.929)	0.229
Wash Material					
Water and soap	96 (38.55%)	53	43	1	
Water only	153 (61.44%)	131	22	4.618 (2.589-8.418)	< 0.001*

the material, washing only with water had higher odds of presenting with an STD in OPD (COR: 4.618 [CI: 2.589 - 8.418]; $p < 0.001$). The results were shown in **Table 5**.

3.6. Multivariable Logistic Regression Analysis

The results of multivariable logistic regression analysis of demographic profile of patients are shown in **Table 6**. We found that socio-demographic factors like perimenopausal age (more than 40 years) had significantly lesser odds of presenting with STD complain (AOR: 0.420 [CI: 0.189 - 0.915]; $p = 0.03$), having a primary and secondary education had significantly lesser odds of presenting with STD complain ((AOR: 0.275 [CI: 0.144 - 0.510]; $p < 0.001$) and (AOR: 0.228 [CI: 0.119 - 0.424]; $p < 0.001$) respectively), living in hostels, dormitories or individually had lesser odds (AOR: 0.542 [CI: 0.309 - 0.944]; $p < 0.031$) of presenting with STD symptoms and so did living in urban areas (AOR: 0.435 [CI: 0.686 - 2.733]; $p < 0.001$). Belonging to a religion other than Hinduism or Islam (AOR: 7.20 [CI: 1.866 - 48.251]; $p = 0.012$) and a caste other than open/ST/SC had a higher odd (AOR: 3.753 [CI: 1.587 - 10.144]; $p < 0.001$) of presenting with STD symptoms.

The results of multivariable logistic regression analysis of clinical profile of patients are shown in **Table 7**. Women who had similar illness in the past were 4 times more likely to present with STD symptoms (AOR: 4.205 [CI: 2.795 - 6.439]; $p < 0.001$). Having a history of an invasive gynecological procedure raised the odds to twice (AOR: 1.953 [CI: 1.184 - 3.295]; $p = 0.010$). Among those who had had sexual intercourse, the age group of less than 35 years was at higher odds of presenting with STD symptoms ($p < 0.001$).

Table 6. Factors associated with STDs among reproductive age women from multivariable logistic regression analysis - Demographics.

Variable	COR (95%CI)	AOR (95%CI)	p-value of AOR
Age			
Less than 20 years	1	1	
20 - 40 years	2.21 (1.15 - 4.29)	1.127 (0.569 - 2.199)	0.727
More than 40 years	1.01 (0.56 - 1.86)	0.420 (0.189 - 0.915)	0.030*
Education			
Illiterate	1	1	
Primary	1.235 (0.13 - 1.413)	0.275 (0.144 - 0.510)	<0.001*
Secondary	0.323 (0.184 - 0.568)	0.228 (0.119 - 0.424)	<0.001*
Higher secondary	0.631 (0.299 - 1.331)	0.108 (0.047 - 0.255)	0.844
Graduate	0.521 (0.107 - 2.541)	0.258 (0.058 - 1.836)	0.258
Residence			
rural	1	1	
urban	0.494 (0.107 - 2.542)	0.435 (0.686 - 2.733)	<0.001*
Income			
Less than 5000	1	1	
More than 5000	0.675 (0.459 - 0.991)	0.846 (0.535 - 1.333)	0.471
Family			
nuclear	1	1	
Joint/extended	1.566 (0.979 - 2.502)	1.815 (1.094 - 3.094)	0.052
Others (dorms, hostels, individual)	0.495 (0.314 - 0.783)	0.542 (0.309 - 0.944)	0.031*
Caste			
Open	1	1	
SC/ST	(0.546 - 0.103)	1.105 (0.655 - 1.888)	0.708
OBC and other minorities	0.237	3.753 (1.587 - 10.144)	<0.001*
Religion			
Hindu	1	1	
Muslim	0.631 (0.434 - 0.919)	0.433 (0.274 - 0.678)	<0.1
Others	6.607 (1.943 - 41.34)	7.20 (1.866 - 48.251)	<0.012*

1: Reference category.

The results of multivariable logistic regression analysis of sanitation practices among are shown in **Table 8**. Among the practices that determined hygiene, not having a toilet and using material other than sanitary napkin had higher odds of presenting with symptoms of STD ((AOR: 1.109 [CI: 0.745 - 1.647]; p = 0.611) and (AOR: 0.780 [CI: 0.516 - 1.180]; p = 0.293) respectively) however they were

Table 7. Factors associated with STDs among reproductive age women from multivariable logistic regression analysis—Clinical and Sexual history.

Variable	COR (95%CI)	AOR (95%CI)	p-value
Similar illness in the past 1 year			
Yes	3.358 (2.291 - 4.988)	4.205 (2.795 - 6.439)	<0.001*
No	1	1	
History of abortion/DNC/other invasive procedure			
Yes	1.655 (1.046 - 2.683)	1.953 (1.184 - 3.295)	0.010*
No	1	1	
Contraception use			
yes	0.546 (0.332 - 0.897)	0.531 (0.308 - 0.887)	0.018*
no	1	1	
Age at first sexual intercourse			
Not yet	1	1	
Less than 25 years	2.200 (1.220 - 4.007)	2.941 (1.552 - 5.661)	<0.001*
25 - 35 years	2.883 (1.754 - 4.762)	3.073 (1.791 - 5.320)	<0.001*
More than 35 years	2.880 (1.292 - 6.770)	2.307 (0.981 - 5.680)	0.060

1: Reference category.

Table 8. Factors associated with STDs among reproductive age women from multivariable logistic regression analysis—MHM and toilet facility.

Variable	COR (95%CI)	AOR (95%CI)	p-value of AOR
Toilet availability and usage			
Yes	1	1	
No	1.234 (0.867 - 1.757)	1.109 (0.745 - 1.647)	0.611
Material used during menstruation			
Cotton/Cloth	1	1	
Sanitary napkin	0.742 (0.510 - 0.981)	0.780 (0.516 - 1.180)	0.293

1: Reference category.

not statistically significant ((p = 0.611 and p = 0.293) respectively).

The results of multivariable logistic regression analysis of menstrual hygiene and wash practices of patients are shown in **Table 9**. As the frequency of washing increased the odds of presenting with an STD decreased however it was not a significant decrease. Usage of water only for washing reusable material was associated with four times greater odds of presenting with STD symptoms (AOR: 4.900 [CI: 2.701 - 9.116]; p < 0.001).

4. Discussion

The prevalence of STD symptoms in the present study is 66.84 which is

Table 9. Factors associated with RTIs among reproductive age women from multivariable logistic regression analysis—MHM and wash material.

Variable	COR (95%CI)	AOR (95%CI)	p-value
Wash frequency for women not using sanitary napkins			
Do not reuse	1	Not included in multiple regression model	
Wash once a day	2.430 (1.339 - 4.505)	1	
Wash twice a day	1.736 (0.940 - 2.45)	0.771 (0.387 - 1.520)	0.454
Wash more than twice a day	1.542 (0.759 - 3.929)	0.821 (0.359 - 1.906)	0.641
Material used for wash			
Water and soap	1	1	
Water only	4.83 (2.606 - 8.9551)	4.900 (2.701 - 9.116)	<0.001*

1: Reference category.

comparatively higher when compared to other states and cities of India (Punjab: 45% [13], Bangalore: 29.15% [14], Surendranagar: 56.5% [15], Delhi: 43.9% [16], Uttar Pradesh: 46.76% [17] and Tamil Nadu: 55.5% [18]). The higher prevalence in the present study might be due to the reason that the study was carried out in the OPD in a community setting and thus, we received better responsiveness. In the present study, age more than 40 years, higher education, residing in urban surrounding and using contraception during sexual intercourse was associated with lesser odds of presenting with STDs [19]. On the other hand, belonging to backward castes, minority religious groups, having experienced similar illness and any invasive gynecological procedures in the past one year, having experienced sexual intercourse between 25 - 35 years and washing reusable material with only water had higher odds of presenting in the OPD with STD symptoms. [20]. Having access to a toilet facility and using hygienic sanitary napkins were also associated with lesser odds of presenting with STD symptoms but the results were not very significant. A stratified analysis of individual symptoms revealed that having presented with vaginal/cervical/urethral discharge with or without itching and irritation had higher odds of not having a toilet facility accessible to them which is line with previous study conducted in Odisha, India [21].

Mounting literature shows that a large proportion of older patients, visiting the healthcare facilities are affected with STD [22]. Married and single women had 1.58 ($p = 0.576$) and 1.52 ($p = 0.618$) times the odds of having STD symptoms in OPD than widowed women. We found that factors determining low socio-economic status like Illiteracy, minority religious groups, living in rural parts of the town and belonging to backward castes were significantly associated with higher chances of presenting with an STD complaint. A previous systematic review and meta-analysis reveals that low socioeconomic profile are associated with increased risk of STI [23]. Interestingly, in the present study an overlap exists as such low socioeconomic conditions are associated with both - higher chances of unhygienic menstrual hygiene and latrine usage and engaging in

careless unprotective sex.

In the present study, women working as a laborer had a higher odd of presenting with an STD to the OPD (COR: 1.387; [CI: 0.85 - 2.26]; $p = 0.179$). This could be due to lesser access of toilet facility for women who work as laborer. Women presenting with vaginal/cervical discharge were twice more likely and others with urethral discharge with or without itching and irritation were 1.43 times more likely to not have accessibility to a usable toilet facility ($p < 0.001$ and $p = 0.204$). This finding highlights the magnitude of difference that can be achieved with the promotion of clean toilet facility in reducing the STD burden in households.

The fact that females presenting with similar symptoms in the past 1 year were more likely to present with STD symptoms shows that there is a possibility of presence of a habit/ chronically unchanging practice that contributed to STD symptoms significantly. We also found that a history of STI symptoms in the year before data collection was significantly associated with the development of STI. A similar study in an urban training health center of a tertiary care hospital in India showed that STI was significantly associated with a history of STIs in the previous year [12]. We found that women with invasive procedures done in the past one year were more likely to present with STI symptoms. A similar study among women in urban slums of India showed that participants who had a history of abortion had higher odds of STI symptoms than those who had no history of abortion [24].

Das *et al.* [25] reported that Indian women using disposable absorbent pads were less likely to develop infections than women using reusable material, consistent with our study suggesting that women who used sanitary napkins had lesser ((OR: 0.742); $p = 0.041$) odds of presenting with an STD and it was not significant. The literature reports that poor sanitation may facilitate transmission where genital contact is made with infected genital fluids on the latrine toilet seat [26]. A study conducted in Dehradun, India, reported an association between STI and poor menstrual hygiene as measured by washing the genitalia less often than twice per day during menstruation [27]. Among the women who did not use sanitary napkins, our study had women who used no-reusable/disposable cotton and women who used cloth and reused them after washing. The women who used cloth had higher odds of presenting with STD symptoms than women who used cotton.

5. Limitations

Our study had several limitations. Some of the crude associations when reanalyzed after stratification lost their significance which may be due to the decrease in stratified sample population. We did not report women who were laboratory confirmed cases of STDs. Furthermore, the results of this study may not be representative of the occurrence and underlying factors of STDs at the national level because it was conducted only in Ahmedabad.

Future studies should include a wider population sample and confirm the suspected STD cases with laboratory findings to better determine the cohort of women who may present with STD symptoms according to syndromic diagnosis but actually suffer from diseases related to improper menstrual and sanitary hygiene.

6. Conclusion

STI is a preventable illness that does affect the public health of the country. There still exists a barrier in the physician-patient discussion regarding sexual acts, safe sex practices and menstrual hygiene. Ever since the concept of treating STI based on syndromic approach has been proposed, the focus has shifted from eliminating the root cause of the disease to symptomatic management. Syndromic approach has effectively treated women from STI, however, it does not reduce incidence of STI as the factors that promote transmission still exist widely in the community. Although our study cannot conclude a causal relationship between unhygienic MHM practices and STI, it highlights the need for a safe, hygienic and comfortable environment for women for MHM practices, so as to reduce the colonization of sexually transmitted pathogens and thereby, reduce the risk of STI.

7. Recommendations

In low- and middle-income countries, for the ease of management of STDs, syndromic approach has been in place. Our study highlights important associations of STD symptoms with socioeconomic conditions and menstrual and sanitary hygiene. With small additions in the execution of syndromic management of STD a wider group of diseases can be dealt with.

In line with significant association of complains of discharge with toilet availability, we recommend ensuring hygienic places for women, particularly those belonging to low socioeconomic backgrounds and promoting its use to practice MHM. Since our study also found a crude association between the use of cotton/cloth as sanitary material and presentation with an STD symptom to OPD, we recommend that a menstrual hygiene education and if we may be too ambitious, a supply of sanitary pads should be made available to women presenting with STD symptoms. To arrest the spread of STI, it is necessary to educate the people regarding the factors that increase transmission and prevalence. Our study has stated the factors that affect the risk of acquisition of STI and the areas that our country's jurisdiction must prioritize while framing health policies. It is certainly every woman's right to practice safe MHM and it is the need of the hour to extend the public health rationale to also cover the reproductive and sexual health of the women.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Rowley, J., Vander, H.S., Korenromp, E., Low, N., Unemo, M., Abu-Raddad, L.J., *et al.* (2019) Global and Regional Estimates of the Prevalence and Incidence of Four Curable Sexually Transmitted Infections in 2016. *WHO Bulletin*, World Health Organization, Geneva.
- [2] Patel, N. and Mazumdar, V. (2019) The Current Status of Sexually Transmitted Infections/Reproductive Tract Infections in Vadodara City: Health-Care Provider Perspective. *Indian Journal of Community Medicine*, **44**, 247-251.
https://doi.org/10.4103/ijcm.IJCM_382_18
- [3] Ademas, A., Adane, M., Sisay, T., Kloos, H., Eneyew, B., Keleb, A., *et al.* (2020) Does Menstrual Hygiene Management and Water, Sanitation, and Hygiene Predict Reproductive Tract Infections among Reproductive Women in Urban Areas in Ethiopia? *PLoS ONE*, **15**, Article ID: e0237696.
<https://doi.org/10.1371/journal.pone.0237696>
- [4] Detels, R., Green, A.M., Klausner, J.D., Katzenstein, D., Gaydos, C., Handsfield, H.H., *et al.* (2011) The Incidence and Correlates of Symptomatic and Asymptomatic *Chlamydia trachomatis* and *Neisseria gonorrhoeae* Infections in Selected Populations in Five Countries. *Sexually Transmitted Diseases*, **38**, 503-509.
<https://doi.org/10.1097/OLQ.0b013e318206c288>
- [5] Krishnamurthy, D.D., Sivagnaname, D.Y., Yasodha, D.S. and Karthika, D.K. (2019) Study of Syndromic Management of Sexually Transmitted Infections in Women of Reproductive Age at a Tertiary Care Hospital in Tamil Nadu, India. *Obs Gyne Review: Journal of Obstetric and Gynecology*, **5**, 231-236.
<https://doi.org/10.17511/joog.2019.i05.04>
- [6] Hussain, M.F.A., Khanani, M.R., Siddiqui, S.E., Manzar, N., Raza, S. and Qamar, S. (2011) Knowledge, Attitudes & Practices (KAP) of General Practitioners (GPs) Regarding Sexually Transmitted Diseases (STDS) and HIV/AIDS in Karachi, Pakistan. *Journal of Pakistan Medical Association*, **61**, 202-205.
- [7] Iiping, S.N. and Pretorius, L. (2012) The Delivery and Quality of Sexually Transmitted Infections Treatment by Private General Practitioners in Windhoek Namibia. *Global Journal of Health Science*, **4**, 156-171.
<https://doi.org/10.5539/gjhs.v4n5p156>
- [8] Khan, A.A. and Khan, A. (2012) Sexually Transmitted Infection Care in Pakistan: The Providers Perspective. *Journal of the Pakistan Medical Association*, **62**, 941-945.
<https://pubmed.ncbi.nlm.nih.gov/23139980/>
- [9] Bitera, R., Alary, M., Mâsse, B., Viens, P., Lowndes, C., Baganizi, E., *et al.* (2012) Quality of Disease Management of Sexually Transmitted Diseases: Investigation of Care in Six Countries in West Africa. *Sante*, **12**, 233-239.
<https://pubmed.ncbi.nlm.nih.gov/12196297/>
- [10] Adhikari, C., Sherchan, L., Thapa, S. and Adhikari L. (2014) Effectiveness of Syndromic STI Case Management/RH Training in Knowledge and Practice of Auxiliary Health Workers. *Journal of Universal College of Medical Sciences*, **2**, 34-37.
<https://doi.org/10.3126/jucms.v2i3.11826>
- [11] Brackbill, R.M., Sternberg, M.R. and Fishbein, M. (1999) Where Do People Go for Treatment of Sexually Transmitted Diseases? *Family Planning Perspectives*, **31**, 10-15.
<https://doi.org/10.2307/2991551>
- [12] Sexton, J., Garnett, G. and Røttingen, J.-A. (2005) Meta-Analysis and Metaregression in Interpreting Study Variability in the Impact of Sexually Transmitted Diseases on Susceptibility to HIV Infection. *Sexually Transmitted Diseases*, **32**, 351-357.

- <https://doi.org/10.1097/01.olq.0000154504.54686.d1>
- [13] Gawande, K.B., Srivastava, A.S. and Kumar, P. (2018) Reproductive Tract Infection and Health Seeking Behaviour: A Cross Sectional Community Based Study. *International Journal of Community Medicine and Public Health*, **5**, 1524-1528. <https://doi.org/10.18203/2394-6040.ijcmph20181229>
- [14] Ratnaprabha, G.K., Thimmaiah, S., Johnson, A. and Ramesh, N. (2015) Prevalence and Awareness of Reproductive Tract Infections among Women in Select Underprivileged Areas of Bangalore City. *International Journal of Medical Science and Public Health*, **4**, 1691-1696. <https://doi.org/10.5455/ijmsph.2015.15052015349>
- [15] Thekdi, K., Patel, K., Patel, N. and Thekdi, P. (2014) A Cross Sectional Study on the Prevalence of Reproductive Tract Infections amongst Married Women in the Rural Area of Surendranagar District. *International Journal of Research in Medical Sciences*, **2**, 215-221. <https://doi.org/10.5455/2320-6012.ijrms20140242>
- [16] Bhilwar, M., Lal, P., Sharma, N., Bhalla, P. and Kumar, A. (2015) Prevalence of Reproductive Tract Infections and Their Determinants in Married Women Residing in an Urban Slum of North-East Delhi, India. *Journal of Natural Science, Biology and Medicine*, **6**, 29-34.
- [17] Rani, V., Dixit, A.M., Kumar, S., Singh, N.P. and Jain, P.K. (2016) Reproductive Morbidity Profile among Ever Married Women (15-44) Years of Rural Etawah District, Uttar Pradesh: A Cross-Sectional Study. *National Journal of Community Medicine*, **7**, 35-40.
- [18] Kamini, B. and Srisanthanakrishnan, V. (2017) A Study on Prevalence of Reproductive Tract Infections among Women in a Rural Area of Tamil Nadu. *International Journal Of Community Medicine And Public Health*, **5**, 336-340. <https://doi.org/10.18203/2394-6040.ijcmph20175809>
- [19] Mansor, N., Ahmad, N. and Rahman, H.A. (2020) Determinants of Knowledge on Sexually Transmitted Infections among Students in Public Higher Education Institutions in Melaka State, Malaysia. *PLoS ONE*, **15**, Article ID: e0240842. <https://doi.org/10.1371/journal.pone.0240842>
- [20] Ayerdi Aguirrebengoa, O., Vera Garcia, M., Rueda Sanchez, M., D'Elia, G., Chavero Méndez, B., Alvargonzalez Arrancudiaga, M., et al. (2020) Risk Factors Associated with Sexually Transmitted Infections and HIV among Adolescents in a Reference clinic in Madrid. *PLoS ONE*, **15**, e0228998. <https://doi.org/10.1371/journal.pone.0228998>
- [21] Torondel, B., Sinha, S., Mohanty, J.R., Swain, T., Sahoo, P., Panda, B., et al. (2018) Association between Unhygienic Menstrual Management Practices and Prevalence of Lower Reproductive Tract Infections: A Hospital-Based Cross-Sectional Study in Odisha, India. *BMC Infectious Diseases*, **18**, Article No. 473. <https://doi.org/10.1186/s12879-018-3384-2>
- [22] Griffiths, M. and David, N. (2013) Sexually Transmitted Infections in Older People. *International Journal of STD & AIDS*, **24**, 756-757. <https://doi.org/10.1177/0956462413488768>
- [23] Crichton, J., Hickman, M., Campbell, R., Batista-Ferrer, H. and Macleod, J. (2015) Socioeconomic Factors and Other Sources of Variation in the Prevalence of Genital Chlamydia Infections: A Systematic review And Meta-Analysis. *BMC Public Health*, **15**, Article No. 729. <https://doi.org/10.1186/s12889-015-2069-7>
- [24] Pandit, M. and Nagarkar, A. (2017) Determinants of Reproductive Tract Infections among Women in Urban Slums of India. *Women's Reproductive Health*, **4**, 106-114. <https://doi.org/10.1080/23293691.2017.1326251>

- [25] Das, P., Baker, K.K., Dutta, A., Swain, T., Sahoo, S., Das, B.S., *et al.* (2015) Menstrual Hygiene Practices, WASH Access and the Risk of Urogenital Infection in Women from Odisha, India. *PLoS ONE*, **10**, Article ID: e0130777. <https://doi.org/10.1371/journal.pone.0130777>
- [26] Muual, D. and Geubbels, E. (2007) Epidemiology of Reproductive Tract Infections (RTIs) in Malawi. *Malawi Medical Journal*, **18**, 176-190. <https://doi.org/10.4314/mmj.v18i4.10921>
<http://www.ajol.info/index.php/mmj/article/view/10921>
- [27] Juyal, R., Kandpal, S.D. and Semwal, J. (2014) Menstrual Hygiene and Reproductive Morbidity in Adolescent Girls in Dehradun, India. *Bangladesh Journal of Medical Science*, **13**, 170-174. <https://doi.org/10.3329/bjms.v13i2.14257>
<https://www.banglajol.info/index.php/BJMS/article/view/14257>

Questionnaire

Sr. Number:

Initials:

Chief complaint:

1. Age (in years):

2. Residence:

- Rural
- Urban

3. Education:

- Literate
- Illiterate

If literate, level of education acquired or acquiring:

- Primary
- Secondary
- higher secondary
- Graduate
- post graduate

4. Occupation:

5. Income: Monthly Income of the Patient:

Total monthly income of the family:

6. Family:

- Nuclear
- Joint

7. Caste:

- Open
- SC
- ST
- OBC

8. Religion:

9. Marital Status:

- Unmarried
- Married
- Separated
- Divorced
- Widow

If married:

For how many years have you stayed with your husband?: _____

At present, are you staying with your husband?: Yes/No

10. Husband's occupation:

11. What was your age at first sexual intercourse:

12. Do you have more than one sexual partners: Yes/No

13. Do you use Contraception: Yes/No

If yes, Which one?: Condom /IUD/OC Pills/permanent sterilisation/others

14. During menstruation, which material do you use?

- Sanitary napkin
- Cloth
- Others _____

If cloth:

Do you reuse it? Yes/No

If Yes,

How do you wash it?

- With water only
- With water and soap

How frequently do you wash it? _____

15. Is there a toilet in your home? Yes/No

16. How many times have you undergone per vaginal examinations in the past 1 year? _____

17. Did you have a delivery/ abortion in the past 1 year?: Yes/No

If Yes—Delivery/Abortion

18. Have you experienced similar illness in the past 1 year? Yes/No

If Yes,

How many times? _____

Did you visit a doctor immediately?: Yes/No

If No?: Reason: _____

19. Does your husband have a similar illness at present?

20. Has your husband experienced similar illness in the past 1 year? Yes/No

If yes, what was it?: Ulcer/Discharge/others