Research article

Sexually transmitted infection associated syndromes among pregnant women attending antenatal care clinics in southwest Ethiopia

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ABSTRACT

Background: Sexually transmitted infections (STIs) are widely reported in pregnant women in Africa and can cause significant maternal and perinatal morbidity. The availability of epidemiologic data on STIs and their associated factors in pregnant women is critical to developing effective prevention strategies. Therefore, this study aimed to assess the prevalence and factors associated with sexually transmitted infection-associated syndromes among pregnant women attending antenatal care clinics at selected public health facilities in southwest Ethiopia.

Methods: A cross-sectional study was carried out with 303 pregnant women who attended ANC between November 1 and 30, 2018. The consecutive sampling technique was employed until the required sample size was reached. The data were collected using a structured and pre-tested questionnaire. Bi-variable and multivariate logistic regressions were used to identify independent variables associated with the outcome of interest. The level of significance was declared at a p-value < 0.05.

Results: Of the 303 respondents surveyed, STI-associated syndromes had a prevalence of 19.1% (95% CI: 14.7%–23.5%). Nearly one-tenth (8.9%) of the respondents had vaginal discharge syndrome followed by lower abdominal or pelvic pain (7.6%). The study also found that being unmarried (AOR = 5.61, 95% CI [2.34–9.36]), not formally educated (AOR = 2.24, 95% CI [1.58–3.86]), having multiple sexual partners in the past 3 months (AOR = 3.93, 95% CI [1.44–5.23]), history of spontaneous abortion (AOR = 4.48, 95% CI [2.21–7.72]), and history of STI (AOR = 3.76, 95% CI [2.24–6.46]) were the factors associated with STI-associated syndromes.

Conclusion: The prevalence of STI-associated syndromes among respondents was 19.1%. The study found that being unmarried, not formally educated, having multiple sexual partners, history of spontaneous abortion, and history of STI were largely accountable for the occurrence of STI-associated syndromes in the study sample. Therefore, in addition to the one-time assessment of HIV and syphilis at the first ANC visit, there is a need to emphasize the syndromic approach diagnosis of STIs among pregnant women during each ANC visit to reduce and ultimately prevent both vertical and horizontal transmissions of STIs.

1. Introduction

Globally, almost half a billion new cases of curable STIs (gonorrhea, chlamydia, syphilis, and trichomoniasis) occur annually [1]. STIs are a growing public health issue worldwide, particularly in developing countries [2, 3]. STI levels are high in all World Health Organization (WHO) regions, with the highest peak rates in the WHO regions of America and Africa next to the WHO region of South and Southeast Asia [4, 5]. STIs are found to be higher in the sub-Saharan Africa region (SSA) [6] and the infection rates tend to be higher for females than for males [7, 8].

In Ethiopia, the number of people infected with HIV has declined annually since 2002. HIV prevalence went from 3.3% in 2000 to 0.9% in 2017, and AIDS-related deaths went from 83,000 deaths in 2000 to 15,600 in 2017 [9,10]. The overall HIV incidence rate between 2015 and 2018 was 6.9 for every 1000 people. The annual HIV incidence rates were 7.3, 6.3, 7.4, and 6.63 per 1000 people in 2015, 2016, 2017, and 2018, respectively [11].

STIs are highly prevalent among pregnant women in Africa and cause significant maternal and perinatal morbidity [12, 13, 14, 15, 16]. STIs are associated with several adverse pregnancy outcomes, including abortions, stillbirths, low birth weight, preterm rupture of membranes, resulting in preterm birth, postpartum sepsis, increased risk of mother-to-child transmission of HIV leading to prenatal morbidity and mortality [17, 18]. Future generations’ health is largely determined by

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fetal development during pregnancy [19]. Issues that arise during the fetal period not only affect the health of the newborn but also have a major health impact on adult health [20]. The high prevalence of STIs among pregnant women and their effect on unborn children demonstrates the need for screening and treatment programs to prevent related perinatal mortality [21].

Although screening methodologies and treatments are widely available and affordable, the burden of STIs is greater in low-income countries [22]. STI accounts for a significant share of perinatal morbidity and mortality in sub-Saharan Africa, which are preventable with adequate antenatal care (ANC) and treatable with early diagnosis [23].

STIs are also highly prevalent in Ethiopia [24]. Despite the negative impact of STIs on pregnant women and their unborn children are well known [21, 25], a great portion of affected women is not in the position to seek medical care. According to the 2016 Demographic Health Survey of Ethiopia, the health-seeking behavior of women who had STI symptoms in the 12 months prior to the survey was 33% [26]. The lack of awareness of STIs risks and delay in seeking medical help may lead to complications like pelvic inflammation, fallopian tube scarring, and possible sterility [18, 27].

Diagnosing STIs etiologically is problematic in many settings. It puts a strain on time, resources, costs, and access to treatment. To address this issue, a syndrome-based approach to managing STI patients has been developed and promoted in many developing world countries [28]. The syndromic approach allows health care professionals to make a diagnosis in a short time without special skills and sophisticated laboratory tests [29]. Although the introduction and intensification of the syndromic approach to STI management in most primary health clinics are not a complete explanation of the infection [30], however, many countries in African, including Ethiopia, managed STIs through syndromic case management [31].

STI surveillance study was conducted in eight sentinel surveillance sites in Ethiopia using the syndromic screening approach and the comonost reported syndrome was vaginal discharge (50%), followed by genital ulcerative disease (9%), and lower abdominal pain (7.3%) [11]. In Ethiopia, pregnant women are screened for HIV and syphilis only once during the initial ANC visit and the prevalence of other STIs among ANC attendees has not been adequately documented using the syndromic approach [32].

A person attending a health facility is embarrassed or ashamed to admit to STI-related signs and symptoms unless a thorough and technical review is conducted by the health professionals [33]. The availability of epidemiologic data on STIs and their associated factors in pregnant women is critical to developing effective prevention strategies [34]. Therefore, this study aimed to assess the prevalence and factors associated with sexually transmitted infection-associated syndromes among pregnant women attending antenatal care clinics at selected public health facilities in southwest Ethiopia.

2. Methods

2.1. Study area and period

The study was carried out in Mizan-Tepi University Teaching Hospital (MTUTH) and Mikan Health Center (MHC). MTUTH and MHC were established in 1986 and 1965 and are found in Mikan-Aman town, Bench-Sheko Zone in the southern nation’s nationalities and people’s state at roughly 574 km southwest of Addis Ababa; the capital city of Ethiopia and 849 km from the regional capital Hawassa. Mizan-Aman town is the administrative center of the Bench-Sheko zone and has two sub-cities (i.e., Mikan & Aman) and five kebeles (the smallest administrative unit in Ethiopia). The town had a total population of 53,724 in 2018 (19,572 males and 34,152 females). The total number of reproductive age group (15–49 years) women was 10,660 (Mikan-Aman town Administration Report, 2018). The town has 1 teaching hospital (MTUTH), 1 health center (MHC), and about 30 private clinics providing different health care services. The study was conducted from November 1 to 30, 2018.

2.2. Study design and populations

A facility-based cross-sectional study was carried out. All pregnant women attending ANC were eligible to be included in this study. All pregnant women enrolled consecutively in the antenatal care clinic during the study period made up the study population.

2.3. Sample size determination and sampling technique

The required sample size was determined by using a single population proportion formula (\( n = \frac{Z^2 \times p(1-p)}{d^2} \)) [35] using the assumptions of the prevalence of sexually transmitted infections to be 26.6% [36], 95% confidence level, 5% margin of error, and 5% for non-response rate compensation. The fine computed sample size was 315. Where \( n \) is the sample size, \( p \) is the expected proportion of sexually transmitted infections, \( d \) is the margin of error, \( Z \) = 2 is the reliability coefficient (confidence coefficient).

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\frac{(1.96)^2 \times 0.266(1 - 0.266)}{(0.05)^2} = 300
\]

Then 5% for non-response rate compensation was added (300*0.05 = 15), 300 + 15 = 315.

Based on the previous 6 months report, the registered number of pregnant women who attend ANC was 250 and 150 per month in MTUTH and MHC, respectively. Then, the total sample size was allocated proportionally to each health facility based on the aforementioned flow of use of antenatal care services. Finally, consecutive sampling was used until the required sample size was reached at each health facility.

2.4. Study variables and measurements

The dependent variable was STI-associated syndromes. The independent variables were socio-demographic characteristics (age, marital status, religion, education, occupation, residence, and level of income), obstetric (gravidity, parity, and history of spontaneous abortion), behavioral (condom use, number of sexual partners, sexual frequency during pregnancy, husband suspected to have other sexual partners) and medical profiles (history of STIs).

The syndromic management approach is based on the identification of consistent groups of symptoms and easily recognized signs (syndromes) and the provision of treatment that will deal with the most serious organisms responsible for producing a syndrome [37]. Prevalence of STI-associated syndrome was defined as the number of study respondents presented with at least one syndrome. Multiple sexual partners are defined as the behavior of a person engaging in unprotected sexual intercourse or having an intimate relationship with two or more sexual partners [38].

2.5. Data collection tools and procedures

The data were gathered via face-to-face interviews using a structured and pre-tested questionnaire. The questionnaire was composed of socio-demographic, STI syndromic screening national guideline [37], obstetric, behavioral, and medical profiles. The questionnaire was prepared by examining the relevant literature in English and then translated into Amharic and back-translated into English to verify consistency by a third-party translator. It was also pre-tested on five percent of the sample, and modifications such as readability, grammar, and the sequence of questions were made. Experts reviewed the questionnaire to verify face validity. With regard to instrument reliability, a reliability test was
performed on the questionnaire status and a good reliability status was gained (Cronbach's alpha of 0.82 was obtained in this study resulted in the same). Two days of training were given to data collectors and supervisors concerning the objective and the process of data collection and to discuss the presence of any ambiguous question in the questionnaire. The data were collected by 4 diploma internship nurse students and supervised by 2 Bachelor's degrees of public health professionals.

2.6. Data processing and analysis

The data collected were entered into the Epi-data version 4.2.0.0 to reduce data entry error and avoiding of inappropriate values by fixing the range of values coded to the software and analyzed using SPSS version 20. The findings are presented using tables. All pregnant women at all levels of antenatal care visits (with no restrictions) were included in the analysis of the study. Bi-variable and multivariable logistic regressions were used to identify independent variables related to the outcome of interest. To avoid overfitting the final model (multi-variable logistic regression model), variables with a p-value < 0.05 at the bi-variable level were included in multivariable logistic regression analysis. Multivariable logistic regression analysis was done to control for potential confounding factors. The level of significance was declared at a p-value < 0.05.

2.7. Ethics approval and consent to participate

Ethical approval was obtained prior to data collection from the Institutional Review Committee of Mizan-Tepi University. Ethical approval was given on 19/09/2018 with the number MTUIRB/032/2018. Permission has been granted from Mizan-Tepi University Teaching Hospital and Mizan Health Center. All study participants were informed of the objective of the study, their right to refuse to participate, anonymity, and confidentiality of the information. Written informed consent was also obtained prior to taking part in this study.

2.8. Treatment

Pregnant women with symptoms or signs suggestive of STIs were treated on-site in accordance to the national guidelines on managing cases of syndromic STIs [37]. During the interview, the women were asked whether they had received treatment for their present symptoms. If they have reported treatment in the past two weeks, leave them, not treat them again. If they did not report treatment, women newly diagnosed were treated following the syndromic STI case management guideline [37]. All women were encouraged to inform their partners and bring them for advice and testing for HIV and syphilis. All the services were provided at no cost to women and their partners.

3. Results

3.1. Socio-demographic characteristics

Of the 315, 303 pregnant women participated in the study, representing an overall response rate of 96.2%. One hundred thirty-three (43.9%) were aged 28–37 years, followed by 18–27 years (42.9%). More than four-fifth (83.8%) of the respondents were married. More than three-fourths (79%) of the respondents were urban dwellers. Two hundred forty-one (79.5%) of the respondents were engaged either in private or governmental institutions (Table 1).

3.2. Obstetric, behavioral and medical profiles

Of the 303, 211 (69.6%) of the respondents were multigravida. Eighty-six (28.4%) of the respondents had a history of spontaneous abortion. Seventy-four (24.4%) and 112 (37%) of the respondents had multiple sexual partners within the last three months and the husband suspected having other sexual partners, respectively. Of the 303 respondents, 42 (13.9%) had previous STIs (Table 2).

3.3. Prevalence of STI-associated syndromes

The prevalence of STI-associated syndromes among respondents was 19.1% (95% CI: 14.7%–23.5%). Of the 58 respondents who reported having at least one STI syndrome, the majority (55%) of the respondents had sub-acute (2–6 weeks) followed by 24% had acute (<2 weeks) and 21% had chronic (>6 weeks) syndrome duration. Twenty-seven (8.9%) of respondents had vaginal discharge syndrome followed by lower abdominal or pelvic pain (7.6%) (Table 3). Among the 11 respondents who already sought treatment, 63.6% preferred private clinics while the rest accessed the government health facility.

3.4. Factors associated with STI-associated syndromes

After adjusting for marital status, educational status, and history of spontaneous abortion as confounding variables, being unmarried (AOR = 5.61, 95% CI [2.34–9.36]), not formally educated (AOR = 2.24, 95% CI [1.50–3.86]), having multiple sexual partners in the past 3 months (AOR = 3.93, 95% CI [1.44–5.23]), history of spontaneous abortion (AOR = 4.48, 95% CI [2.21–7.72]) and history of STI (AOR = 3.76, 95% CI [2.44–6.46]) were the factors associated with STI-associated syndromes (Table 4).

4. Discussion

This study aimed to assess the prevalence and factors associated with sexually transmitted infection-associated syndromes among pregnant women attending antenatal care clinics at selected public health facilities in southwest Ethiopia. The prevalence of STI-associated syndromes was 19.1% (95% CI: 14.7%–23.5%). This finding was higher than 1.8% in Merawi [39], and 8.5% in Mekelle [40] in Ethiopia. The variation observed between this study and other previous studies locally could be due to the difference in operational definition, sample size, and methodology in general. Besides, the educational status, behavioral, socio-demographic, and socio-cultural profiles of the study participants may create a great variation.

In this study, marital status was significantly linked to STI-associated syndromes. Unmarried respondents were 5.6 times more likely to have STI-associated syndromes than those who were married. This finding was consistent with studies conducted elsewhere [40, 41, 42, 43, 44, 45]. This could be due to the less likely practice of protected sex among unmarried respondents. Being married inclines one to take preventive measures against the spread of sexually transmitted infections because single pregnant women may be more involved in unprotected sex, which increases the risk of contracting STIs [46].

Educational status was statistically associated with having STI-associated syndromes. Respondents who are not formally educated were 2.2 times more likely to be diagnosed with STI-associated syndromes than those who are formally educated. This finding was supported by the idea of low educational status associated with a high chance of acquiring sexually transmitted diseases [44, 45, 47, 48, 49]. This could be due to the application of preventive behaviors resulting from their better education.

Having multiple sexual partners was strongly associated with the development of STI-associated syndromes. In this study, respondents who had multiple sexual partners in the last 3 months were 3.9 times more likely to be diagnosed with STI-associated syndromes than those who did not. This finding was consistent with several studies across the world [40, 42, 47, 48, 50, 51]. This could be due to the risk of acquiring the infection from one of the multiple partners if there was the possibility of unprotected sexual intercourse.

This study revealed a strong association between the history of spontaneous abortion and developing STI-associated syndromes.
Respondents who had a history of spontaneous abortion were 4.5 times more likely to be diagnosed with STI-associated syndromes compared to their counterparts who had no history of spontaneous abortions. This finding was supported by several studies conducted elsewhere [42, 48, 51]. This could be explained by the idea that women who had an abortion were more likely to have unprotected sexual relations, leading subsequently to sexually transmitted infections [46].

Having a history of STI is associated with a high chance of developing STI-associated syndromes. Respondents with a history of STI had 3.8 higher odds of being diagnosed with STI-associated syndromes compared to their counterparts who had no history of STI. This finding was consistent with previous studies [41, 50]. This could be due to relapse, untreated sexual partners, poor adherence to treatment, improper treatment, and antimicrobial drug resistance [34].

4.1. Limitations of the study

First, the syndromic approach of the diagnosis does not truly reflect the specific prevalence of STIs among study samples. Second, the insufficiency of appropriate references for comparison and discussion was a great limitation to this study. Third, due to the reliance on self-reported data, the sensitive nature, and feeling ashamed to report sexual histories and their associated disease outcomes (STI syndromes) resulted in underestimation of the prevalence of STI-associated syndromes (may be subject to social desirability bias and recall bias). Fourth, the use of the convenience sampling technique makes it difficult to generalize the findings to other pregnant women in Ethiopia. Since the study was done in a hospital, the reported prevalence of STI-associated syndromes might not reflect the actual burden of the problem at the community level (those who may have had STI-associated syndromes but did not attend ANC were missed).

5. Conclusion

The prevalence of STI-associated syndromes among respondents was 19.1%. The study found that being unmarried, not formally educated, having multiple sexual partners, history of spontaneous abortion, and history of STI were largely accountable for the occurrence of the STI-associated syndromes in the study sample. Therefore, in addition to the one-time assessment of HIV and syphilis at the first ANC visit, there is a need to emphasize the syndromic approach diagnosis of STIs among pregnant women during each ANC visit to reduce and ultimately prevent both vertical and horizontal transmissions of STIs.

Declarations

Author contribution statement

Tewodros Yosef: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interests statement

The author declares no conflict of interest

Additional information

No additional information is available for this paper.

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Appendices

Appendix 1: Tables

Table 1. Sociodemographic characteristics of the respondents at selected public health facilities in southwest Ethiopia.

| Variables          | Categories | Frequency (n) | Percent (%) |
|--------------------|------------|---------------|-------------|
| Age                | 18–27      | 130           | 42.9        |
|                    | 28–37      | 133           | 43.9        |
|                    | ≥38        | 40            | 13.2        |
| Marital status     | Unmarried  | 49            | 16.2        |
|                    | Married    | 254           | 83.8        |
| Religion           | Protestant | 139           | 45.9        |
|                    | Orthodox   | 117           | 38.6        |
|                    | Muslim     | 47            | 15.5        |
| Ethnicity          | Bench      | 154           | 50.8        |
|                    | Keffa      | 94            | 31.0        |
|                    | Amhara     | 29            | 9.60        |
|                    | Sheka      | 14            | 4.60        |
|                    | Others*    | 12            | 4.00        |
| Place of residence | Urban      | 240           | 79.0        |
|                    | Rural      | 63            | 21.0        |

(continued on next page)
### Table 1 (continued)

| Variables                  | Categories          | Frequency (n) | Percent (%) |
|----------------------------|---------------------|---------------|-------------|
| Educational status         | Not formally educated | 107           | 35.3        |
|                            | Formally educated   | 196           | 64.7        |
| Employment status          | Employed            | 241           | 79.5        |
|                            | Unemployed           | 62            | 20.5        |

*Includes Oromo, Tegere and Gurage ethnicities.

### Table 2. Obstetric, behavioral and medical profiles of the respondents at selected public health facilities in southwest Ethiopia.

| Variables                                | Categories          | Frequency (n) | Percent (%) |
|------------------------------------------|---------------------|---------------|-------------|
| Gravidity                                | Primigravida        | 92            | 30.4        |
|                                          | Multigravida        | 211           | 69.6        |
| Parity                                   | Primipara           | 113           | 37.3        |
|                                          | Multipara           | 190           | 62.7        |
| History of spontaneous abortion          | Yes                 | 86            | 28.4        |
|                                          | No                  | 217           | 71.6        |
| Condom use for the last time sex         | Yes                 | 48            | 15.8        |
|                                          | No                  | 255           | 84.2        |
| Multiple sexual partners in the past 3 months | Yes              | 74            | 24.4        |
|                                          | No                  | 229           | 75.6        |
| Sexual frequency during pregnancy        | <5/month            | 183           | 60.4        |
|                                          | ≥5/month            | 120           | 39.6        |
| Husband suspected to have other sexual partners | Yes             | 112           | 37.0        |
|                                          | No                  | 191           | 63.0        |
| History of STI                           | Present             | 42            | 13.9        |
|                                          | Absent              | 261           | 86.1        |

### Table 3. Syndromes of sexually transmitted infections among the sampled pregnant women at selected public health facilities in southwest Ethiopia.

| STI syndromes                       | Categories          | Frequency (n) | Percent (%) |
|-------------------------------------|---------------------|---------------|-------------|
| Vaginal discharge syndrome          | Yes                 | 27            | 8.90        |
|                                     | No                  | 276           | 91.1        |
| Lower abdominal or pelvic pain      | Yes                 | 23            | 7.60        |
|                                     | No                  | 280           | 92.4        |
| Genital ulcers                      | Yes                 | 15            | 5.00        |
|                                     | No                  | 288           | 95.0        |
| Inguinal bubo (tender inguinal lymph adenopathy) | Yes            | 18            | 5.90        |
|                                     | No                  | 285           | 94.1        |

### Table 4. Factors associated with STI-associated syndromes among the respondents at selected public health facilities in southwest Ethiopia.

| Variables                                | Categories          | STI-associated syndromes | COR (95% CI) | AOR (95% CI) |
|------------------------------------------|---------------------|--------------------------|--------------|--------------|
| Age group (years)                        | 18–27               | 28                       | 102          | 1            |
|                                          | 28–37               | 16                       | 117          | 0.50 (0.41–0.76) | 0.46 (0.38–1.23) |
|                                          | ≥38                 | 14                       | 26           | 1.96 (1.21–3.16) | 1.56 (0.82–2.35) |
| Marital status                           | Unmarried           | 26                       | 23           | 7.84 (2.14–10.6) | 5.61 (2.34–9.36)** |
|                                          | Married             | 32                       | 222          | 1            | 1            |
| Educational status                       | Not formally educated | 35                       | 72           | 3.66 (1.69–5.42) | 2.24 (1.58–3.86)** |
|                                          | Formally educated   | 23                       | 173          | 1            | 1            |
| Multiple sexual partners in the past 3 months | Yes             | 28                       | 46           | 4.04 (1.54–6.38) | 3.93 (1.44–5.23)** |
|                                          | No                  | 30                       | 199          | 1            | 1            |
| History of spontaneous abortion          | Yes                 | 36                       | 50           | 6.38 (4.26–9.36) | 4.48 (2.21–7.72)** |
|                                          | No                  | 22                       | 195          | 1            | 1            |
| History of STI                           | Yes                 | 18                       | 24           | 4.14 (2.34–7.21) | 3.76 (2.44–6.46)* |
|                                          | No                  | 40                       | 221          | 1            | 1            |

AOR: Adjusted odds ratio, CI: Confidence Interval, COR: Crude odds ratio, *p-value < 0.05, **p-value < 0.01, STI: Sexually Transmitted Infection.
