MAGNITUDE AND ASSOCIATED FACTORS FOR SEXUALLY TRANSMITTED DISEASE AMONG HAWASSA INDUSTRIAL PARK WORKERS, SOUTHERN ETHIOPIA

Solomon Tesfaye, MPH[1], Wanzahun Godana, MPH[1], Selamawit Gebeyehu, MPH[1], Firehiwot Haile, MPH[1]

ABSTRACT

BACKGROUND: Sexually Transmitted Infections are a group of infectious diseases spread through unprotected sexual intercourses and resulting in curable and incurable diseases. Around the world estimated about 376 million people become ill each year with one of four common curable Sexually Transmitted Infections. It is estimated about 86 million new cases of curable STIs occurred in Africa region.

OBJECTIVES: To assess the magnitude and associated factors for Sexually transmitted infections among Hawassa industrial park workers, Southern Ethiopia, 2020.

METHOD: Institution based cross-sectional study design was conducted from July to August, 2020. Self-reported syndromic approach was used to assess magnitude and associated factors for STIs. Multistage sampling technique was used. Both bivariate and multivariable logistic regression analyses were employed. P-value of <0.05 and AOR with 95%CI was used to determine the presence of association between covariates and dependent variable.

RESULT: Self-reported Sexually Transmitted Infection magnitude in the last 12 months was 18.7% (18.54-18.91) among the Hawassa industry park workers. Hometown of residence (AOR=2.03; 95%CI: 1.16-3.55), Poor knowledge of STIs (AOR=2.59; 95%CI: 1.59-4.21,) Drinking alcohol (AOR=3.10; 95%CI: 1.68-5.71) ,View/read pornographic materials (AOR=4.28; 95%CI: 2.63-6.97) and age at first sexual intercourse<18 years (AOR=2.01; 95%CI: 1.23-3.28) were significantly associated with the magnitude of STIs.

CONCLUSION AND RECOMMENDATION: Self-reported magnitude of STIs among HIP was found to be high. Design and implement work place based STI prevention and control programs which focus on reduction of risky sexual practice and promotion of safer sexual practices among these high-risk population is very crucial.

KEYWORDS: STIs, Syndromes, Risky sexual practices, Industry Park.

(The Ethiopian Journal of Reproductive Health; 2022; 14;22-31)

1 School of Public Health, College of Medicine and Health Sciences, Arba Minch University

INTRODUCTION

Globally, a total of 376.4 million new curable urogenital infections with chlamydia, gonorrhoea, trichomoniasis and syphilis in 15–49-year-old occur among women and men in 2016. This estimate corresponds to an average of just over 1 million new infections each day. [3,4] It is projected about 86 million new cases of curable STIs occurred in Africa regions. [1]

STIs have enormous health, social and economic consequences. The most serious health consequences of STIs, other than HIV/AIDS, tend to occur in women and newborn children. Complications in women include cervical cancer, pelvic inflammatory disease with resulting infertility, chronic abdominal pain, ectopic pregnancy, preterm labor and related maternal mortality. In neonates it results in neonatal death, low birth weight and prematurity, sepsis, pneumonia, neonatal conjunctivitis, and congenital deformities. In addition, the costs of STI drugs may place a heavy financial burden on families, communities and the country at large. Generally, failure to diagnose and treat STIs at an early stage may result in serious complications .[1,2,5–7]

Taking this into account, countries across the world set a goal to end sexually transmitted infection epidemics as major public health concerns. In 2030 its targeted 90% reduction of T. pallidum,90% reduction in N. gonorrhoeae incidence globally and 50 or fewer cases of congenital syphilis per 100 000 live births in 80% of countries. [4]

One of the priority actions to reach the targets is achieving early diagnosis of sexually transmitted infections and linkage to treatment. Globally, one of etiologic, clinical and syndromic diagnostic approach is being used for early diagnosis. However, the syndromic approach has been shown to be highly effective for the management of majority of the STIs in resource limited countries. It helps to have prompt and efficient case detection and treatment, results in immediate health benefits for individual patients. Ethiopia has been implementing syndromic approach since 2001 by adopting the WHO generic guidelines to serve as a national guideline for the management of STIs.[2,8] In the presence of large scale up of health care investments and strategies applied for the prevention and treatment of STIs in Ethiopia the issue continues to be a young adults' health problem. According to Ethiopian demographic and health survey 2016(EDHS 2016), overall 4% of women and men age 15-49 reported having syndromes of STI in the last 12 months. [9] Other studies conducted among Wolaita Sodo University and University of Gonder students shows that self-reported prevalence of STIs to be 19.5% and 18.2%, respectively. [10,11] Similar studies conducted among high school students at Bahir-dar 13.1% reported to have syndromes of STIs. [12]

Factors affecting the high prevalence of STIs, including HIV, have been documented in many epidemiological studies across different populations. Behavioral, socioeconomic and demographic risk factors, including age at first sexual intercourse, inconsistent condom use, having multiple sexual partners, female sex, being single and the partner's sexual behavior, the location and culture are some of them. [3,11–16]

Currently the Ethiopian government came up with the decision to develop and expand industrial parks providing the necessary services and facilities for industries. [17] Industry Parks workers are one of the risk population to acquire STIs. However, there is no information on the prevalence and factors associated with STIs among industry park workers. The availability of epidemiological data on STIs and associated risk factors in this population is essential for the development of successful prevention, diagnosis and management strategies in the country. This study was therefore, conducted to determine the prevalence and risk factors associated with STIs among industry park workers.

METHODS AND MATERIALS

Study area

The study was conducted at Hawassa city which is the capital of the Sidama and Southern Nation Nationalities Peoples Regional State, and located

273 km south of Addis Ababa, the capital city of Ethiopia. The park is developed under the national industrial park development corporation covering a total area of 300 hectares. Currently, about 30,000 workers were hired across the 52 factory sheds of the park.

Study design and period

- Institution based cross-sectional study was conducted among Hawassa industrial park workers from July 26 to August 26, 2020.

Source and study Population

Source population was HIP workers and Workers in randomly selected factory sheds during the study period were Study population.

Inclusion and exclusion criteria

All HIP workers were included, and HIP workers who are severely ill during study period and Recruitment time less than 30 days were excluded.

Operational definitions

- STI cases for Male/Female: They were considered STIs cases if he/she reported at least one of history of urethral discharge, genital ulcer/sores, scrotal swelling, inguinal bubo, abnormal vaginal discharge, or lower abdominal pain syndromes in the last 12 months.

Sample size determination

The sample size was determined using single population proportion formula by taking the prevalence of STIs (19.5%) obtained from a study conducted among Wolaita Sodo University students.[10],Design effect of 2.6,Non-response rate of 15% ,n= 384, Multiplied by design effect of 2.6 and non-response rate (15%) was added.Final sample size (nf) = [(242×2.6) + 15%] =666

Sampling technique and procedures

There are 52 sheds in HIP and about 30,000 regular workers within it. Multistage sampling technique was used to select representative study subjects. Simple random sampling technique (lottery method) was used to select the factory shed from the total of 52 sheds by taking 29% (15 sheds) of the total factory sheds. To assure the representativeness of the data, the sample size was proportionally allocated to all (15 sheds) proportional to their number of workers.

Data collection procedures

Data was collected using structured self-administered questionnaires. The questionnaire was first prepared in English, and translated into Amharic then, translated back into English, to check the consistency. Five data collectors and one supervisor were participated in the data collection process, and monitoring.

Data quality management

One week prior to data collection a pre-test was conducted on 5% (34) of the sample size at MOHA soft drink factory in Hawassa. Depending on the result of pretest, correction and modification were done on questionnaire before applying on the study population.

Data processing and analysis

Data was cleaned, coded and entered in SPSS version 21.0 software for further analysis. Frequencies and cross tabulations were used to summarize descriptive statistics of the data. Tables and texts were used for data presentation. Bivariable logistic regression analysis was used to identify candidate variables for multivariable logistic regression at P-value of ≤0.25. The strength of association was determined using multivariable logistic regression at p-value <0.05, and 95% CI of adjusted Odd Ratio (AOR).

Ethical considerations

Ethical clearance was obtained from the institutional review board of college of medicine and health science of Arba Minch University. Then, permission letter was written to HIP from school of Public Health. Informed written consent was obtained from each participant after informing them the purpose, benefit, risk, confidentiality of the information and the voluntary nature of the participation in the study. The respondents were assured that neither the data collectors nor the supervisors would have access to their responses. During the data collection period, participants were counseled on prevention mechanisms of Covid-19. In addition to this personal protection mechanism; such as, hand washing, face masking and physical distancing were applied for both data collectors and study participants.

RESULTS

Socio-demographic and Economic characteristics

In this study, 647 study participants were involved in the study making a response rate of (97.15%). The mean age of study participants was 27 years (SD ± 3.2 years). Among study participants 118 (17.9%) were male and 531 (82.1%) were females, 520 (80.4%) were single in marital status, and 358 (55.3%) were Protestant. (Table1).

Table 1. Socio-Demographic characteristics of HIP Workers, Southern Ethiopia, 2020.(n=647)

Variables		Frequency	Percent
Sex	Male	116	17.9
	Female	531	82.1
Age	15-19	9	1.4
	20-24	116	17.9
	25-29	405	62.6
	30-34	111	17.2
	35+	6	0.9
Length of Stay at HIP	Less than 6 months	36	5.6
	6-12 months	165	25.5
	Greater than 12 months	446	68.9
Religion	Protestant	358	55.3
	Orthodox	182	28.1
	Muslim	65	10.0
	Catholic	42	6.5
Ethnic groups	Sidama	344	53.2
	Oromo	95	14.7
	Amhara	84	13.0
	Wolayita	62	9.4
	Kambata	34	5.3
	Other*	28	4.3
Marital status	Single	520	80.4
	Married	112	17.3
	Divorced	15	2.3
Living arrangement	Separately	232	35.9
	Friends	197	30.4
	Wife or husband	108	16.7
	Family	72	11.1
	Relatives	38	5.9
Income of respondents	450-1000	24	3.7
	1001-1500	203	31.4
	1501-5000	375	58
	5001-6500	45	7.0
Hometown residence	Urban	246	38.0
	Rural	401	62.0
Education status	Read and write	20	3.1
	Primary	92	14.2
	Secondary	292	45.1
	Diploma and above	243	37.6

*others: Hadiya, Silte, Gurage, Halaba

Knowledge of respondents about STIs

The overall Knowledge of study participants shows that, about 317(49.0%) of the study participants had good knowledge of STIs.

Non sexual behavioral characteristics

Respondents were asked their experience of non-sexual risky practices to assess their exposure to substances and pornographic materials; and the findings shows that, overall, 126 (19.5%) of them used at least one substance in the last 12 months. About 185 (28.6%) of study participants view/ read pornographic materials in the last 12 months (Table3).

Table 3. Non-sexual behavioral characteristics of HIP Workers, Southern Ethiopia, 2020

Variables		Frequency	Percent
Chew khat	Yes	67	10.4
	No	580	89.6
Khat chewing frequency	Daily	6	8.9
	More than once in a week	23	34.3
	Weekly	31	46.3
	Monthly and above	7	10.4
Drink alcohol	Yes	96	14.8
	No	551	85.2
Alcohol drinking frequency	Daily	25	26.0
	More than once in a week	18	18.8
	Weekly	21	21.9
	Monthly and above	32	33.3
Shisha smoke	Yes	16	2.5
	No	631	97.5
Shisha smoking frequency	More than once in a week	3	18.8
	Weekly	3	18.8
	Monthly and above	10	62.5
Over all substance use	Yes	126	19.5
	No	521	80.5
Reason for substance use (n=126)	Satisfaction	76	60.3
	Work hard	13	10.3
	Peer pressure	20	15.9
	Relief tension	17	13.5
View/read Pornographic materials	Yes	185	28.6
	No	462	71.4
Pornography types	Mobile video	99	53.5
	Internet	51	27.6
	Movies or television	31	16.8
	Reading materials	4	2.2

Sexual behavior of the Respondents

About 647 (98.5%) respondents had a history of sexual intercourse in life time. About 577 (89.2%) of the study participants has MSPs in lifetime. (Table4).

Table 4: Sexual practices among HIP Workers, Southern Ethiopia, 2020

Variables		Frequency	Percent
Extra-marital sex(n=112)	Yes	5	4.5
	No	107	95.5
Age at first sex(n=647)	< 18	324	50.1
	≥18	323	49.9
No. of life time sexual partners(n=647)	1	70	10.8
	≥2	577	89.2
Condom ever used(n=647)	Yes	419	64.8
	No	228	35.2
Condom use frequency	Always	119	28.4
	Mostly	141	33.7
	Sometimes	159	37.9
Reason for not use condom always	Trust partner	222	42.0
	Partner refuse	127	24.1
	I didn't get it	73	13.8
	I dislike it	70	13.3
	Ashamed to buy	36	6.8
Sexual intercourse in the last 12 months(n=647)	Yes	619	95.7
	No	28	4.3
No. of sexual partners in the last 12months(n=619)	1	166	26.8
	≥2	453	73.2
Condom use in the last 12 months(n=619)	Yes	221	35.7
	No	398	64.3
Having current sexual partners	Yes	254	38.7
	No	365	61.3
Having sex for the benefit/Gift(n=619)	Yes	29	4.7
	No	590	95.3
Sex after substance use(n=619)	Yes	13	2.1
	No	606	97.9
Sex with CSWs(n=117)	Yes	12	10.3
	No	104	89.7
Condom use with CSWs(n=12)	Yes	8	66.7
	No	4	33.3

Factors Associated with STIs among HIP workers

After adjusting for the possible confounders in multivariate logistic regression analysis variables, Hometown of residence (AOR=2.03; 95%CI: 1.16-3.55), Poor knowledge of STIs (AOR=2.59; 95%CI: 1.59-4.21,) Drinking alcohol (AOR=3.10; 95%CI: 1.68-5.71) ,View/read pornographic materials (AOR=4.28; 95%CI: 2.63-6.97) and age at first sexual intercourse<18 years (AOR=2.01; 95%CI: 1.23-3.28)were significantly associated with the magnitude of STIs.

Table 5: Bivariate and Multivariable logistic regression analysis for factors associated with STIs among HIP workers, Southern Ethiopia, 2020.

VARIABLES		STI		COR (95%CI)	AOR (95%CI)
		Yes	No		
Sex	Male	15(12.9)	101(87.1)	1	1
	Female	106(20.0)	425(80.0)	1.68(0.94-3.00)*	1.86(0.86-4.02)
Marital status	Married	9(8.0)	103(92.0)	1	
	Single	102(19.6)	418(80.4)	2.79(1.36-5.71)	-
	Divorced	10(66.7)	5(33.3)	22.89(6.41-81.62)	-
Age in year	< 24	28(22.4)	97(77.6)	0.93(0.49-1.77)	
	25-29	69(17.0)	336(83.0)	0.84(0.45-1.55)	
	≥30	24(20.5)	93(79.5)	1	
Hometown residence	Urban	30(12.2)	216(87.8)	1	1
	Rural	91(22.7)	310(77.3)	2.11(1.35-3.31)*	2.03(1.16-3.55)**
Income	450-1000	5(20.8)	19(79.2)	2.69(0.65-11.19)	-
	1001-1500	53(26.1)	150(73.9)	3.62(1.24-10.59)	-
	1501-5000	59(15.7)	316(84.3)	1.91(0.66-5.54)	-
	5001-6500	4(8.9)	41(91.1)	1	
Education status	Read & Write	7(35.0)	13(65.0)	3.31(1.23-8.89)*	2.93(0.96-9.01)
	Primary	25(27.2)	67(72.8)	2.29(1.27-4.12)	1.58(0.79-3.17)
	Secondary	55(18.8)	237(81.2)	1.43(0.89-2.27)	1.06(0.60-1.84)
	Diploma & above	34(14.0)	209(86.0)	1	1
Knowledge	poor	85(25.8)	245(74.2)	2.71(1.77-4.15)*	2.59(1.59-4.21)**
	good	36(11.4)	281(88.6)	1	-
Chew khat					
	yes	14(20.9)	53(79.1)	1.16(0.63-2.18)	-
	no	107(18.4)	473(81.6)	1	
Alcohol drink	Yes	33(34.4)	63(65.6)	2.76(1.71-4.44)*	3.10(1.68-5.71)**
	No	88(16.0)	463(84.0)	1	1.00
Shisha smoke					
	yes	4(25.0)	12(75.0)	1.46(0.46-4.62)	
	no	117(18.5)	514(81.5)	1	
View/read Pornography	Yes	63(34.1)	122(65.9)	3.59(2.38-5.42)*	4.28(2.63-6.97)*
	No	58(12.6)	404(87.4)	1	1
Age at first sex					
	<18	81(25.0)	243(75.3)	2.35(1.55-3.57)*	2.01(1.23-3.28*
	≥18	40(12.4)	283(87.6)	1	1
Condom ever used					
	yes	60(14.3)	359(85.7)	0.45(0.31-0.68)	
	no	61(26.8)	167(73.2)	1	

adjusted odds ratio.

DISCUSSION

This study shows that 121 (18.7%) with (95%CI; 18.54-18.91) of sexually active HIP workers had self-reported STIs syndromes in the last 12 months. The finding of this study is comparable with studies conducted among Wolaita sodo university and University of Gondar students, 19.5% and 18.2%, respectively. [10,11] However, it is somewhat lower than studies conducted among young women in Northern Ethiopia 21.3%.[18] This difference could be due to the study subjects of Northern Ethiopia were only women and selection was from health facilities there is a high chance to find suspected cases. While, the finding from this study is higher when compared with the EDHS 2016 national report 4% [9],and population based survey in the city of São Paulo, Brazil 6.3% [13] and School youths at Bahir-dar 13.1%.[12]This could be due to EDHS survey, People living in rural areas of Lucknow and population-based survey in Brazil was community-based, in which most study subjects could be all age groups and also may be differences in data collection method. The difference from study conducted among school youth in Bahir dar may be due to differences in age group, living condition and work habit of the HIP workers.

This study shows that those workers with poor knowledge of STIs were 2.6 times more likely to develop STIs than workers with good knowledge of STIs. The finding consistent with other studies conducted at the Wolaita Sodo university 4.8 times and University of Gondar students 3.3 times more risky than good knowledge of STI. [10,11]Overall, 334 (50.8%) of the study subjects have poor knowledge on STI. This finding was consistent with a studies conducted among University of Gondar students 55.3%, young women in Northern Ethiopia 40.4% and Madawalabu University students 57.5% have poor knowledge of STI. [11,19,20]

This study indicated that having drunk alcohol statistically significant association with risks of STIs. Those workers who had drunk alcohol were about 3.1 times more likely to have risky for STIs when compared to those who didn't drink alcohol. The finding of this studies was consistent with study conducted among the female partners of inmates in Brazil, alcohol drinkers were 1.7 times more likely to have a STI than non-drinkers. [19]

Exposing to pornographic materials could alter the normal sexual desire and care taking of exposure to STIs. This study shows that about 42.8% of respondents were view/read pornography materials in the last 12 months. Those who view/read pornographic materials were 4.4 times more likely to have STI than when compared with those who didn't view/read pornographic materials. The finding was comparable with studies conducted among University of Gondar students, 1.5 times more likely to have an STI than counterpart. [11]

This study shows that those who comes from rural areas where 2.03 times more likely to have the risks for STIs when compared to those who are urban areas. This finding was consistent with community based survey in Adami Tullu, which shows that rural residents where 2.3 times more likely to have STIs than urban residents [21]. This difference may be poor knowledge on transmission and prevention methods of STIs in rural areas. Most of workers came from different rural areas having different cultures and values. They are vulnerable to risky sexual practices in new environment, living away from the family, may limit workers to protect from peer pressure and could also be easily deceived with monetary incentives from persons who seek out sex because low monthly payment in HIP.

To sum up, the study has incorporated many variables and successfully showed important recommendations that can be used in the formulation of interventions to improve the diagnosis and treatment of STI in the area. However, since sexual behavior and practice is a private, intimate and sensitive issue, respondents may feel embarrassed to report syndromes (May subject to

bias). So, self-administered questionnaires were used to keep privacy, and study participants were informed the purpose and confidentiality of the study before data collection. In this study STI was assessed only through the self-report of the workers, no physical and laboratory examination was done and since we are using a syndromic approach, we may miss asymptomatic workers and we may misdiagnose signs and symptoms due to other health problems as similar manifestations with STI syndromes. So under/over reporting of STIs may be possible.

CONCLUSION

The self-reported prevalence of STIs among Hawassa industry park workers was high. Hometown residence, drinking alcohol, view/read pornographic materials and poor knowledge of STIs were factors significantly associated with the magnitude of sexually transmitted infections.

Hawassa city health department needs to address sexual reproductive health promotion, particularly STI prevention and control measures for workers by using condom correctly and consistently, design and implement workplace based STI prevention programs which focus on awareness creation on safer sex practices. Also, Hawassa Industry Park should design and implement awareness creation and risky sexual practices reduction activities through integrating into the workplace, promote condom use, and supply information on their importance was needed.

ABBREVIATIONS

AOR: adjusted odds ratio, COR: crudes odds ratio, CSW: commercial sex workers, EDHS: Ethiopian demographic and health survey, HIP: Hawassa industrial park, HIV/AIDS: Human Immune Deficiency Virus/ Acquired Immune Deficiency Syndrome, STIs: Sexually transmitted infections, and WHO: World Health Organization

DECLARATIONS:

Data Sharing Statement

The data used to support the findings of this study are available from the corresponding author upon request.

Acknowledgments

We would like to acknowledge all study participants for their voluntary participation in this study. We would like to extend our gratitude to Arba Minch University for all the support and opportunity that provided for us to conduct this study.

Funding

Arba Minch University supports this research financially. The university has no role in the design of the study, collection, analysis, and interpretation of the data and in writing the manuscript.

Disclosure

The authors report no conflicts of interest in this work.

CORRESPONDING AUTHOR

Selamawit Gebeyehu
Arba Minch University, Arba Minch, Ethiopia
Email: emugebe.sg@gmail.com

REFERENCES

1. World Health Organization. Sexually transmitted infections fact sheet. 2008. Available: www.who.int
2. Kimberly A. Workowski GAB. Sexually Transmitted Diseases Treatment Guidelines , 2015. HHS Public Access. 2018;64: 1–137.
3. Rowley J, Hoorn V, Korenromp E, Low N, Unemo M, Abu- LJ, et al. Chlamydia , gonorrhoea , trichomoniasis and syphilis : global prevalence and incidence estimates , 2016. Bull World Heal Organ. 2019;97: 548–562. doi:http://dx.doi.org/10.2471/BLT.18.228486
4. Health G, Strategy S. Global health sector strategy on sexually transmitted infections 2016–2021. 2021.
5. View G, Mbofana FS, Brito FJ, Saifodine A, Cliff JL. Syndromic management of sexually transmitted diseases at primary care level, Mozambique. In: www.sextransinf.com. 1988 pp. 16–17.
6. World Health Organization. Sexually Transmitted Infections:fact sheet. Emerg Med Clin North Am. 2019. doi:10.1016/j.emc.2019.07.009
7. Strategy L, The FOR, Of P, Transmitted S. Global strategy for the prevention and control of sexually transmitted infections: 2006–2015. 2006.
8. Republic FD. National guidelines for the management of sexually transmitted infections using syndromic approach. 2015.
9. Central Statistical Agency(CSA)[Ethiopia]. Ethiopia Demographic and Health Survey. 2016. Available: DHSprogram.com
10. Yohannes B, Gelibo T, Tarekegn M, Gelibo T. Prevalence and Associated Factors of Sexually Transmitted Infections among Students of Wolaita Sodo University, Southern Ethiopia. Int J Sci Technol Res. 2013;2: 86–94.
11. Kassie BA, Yenus H, Berhe R, Kassahun EA. Prevalence of sexually transmitted infections and associated factors among the University of Gondar students , Northwest Ethiopia : a cross-sectional study. 2019; 1–8.
12. Getachew M, Haile D, Churko C, Gube AA. Magnitude of self-reported syndromes of sexually transmitted infections and its associated factors among young incarcerated persons (18–29 years) in correctional facilities of Gamo Gofa zone, southern Ethiopia. Risk Manag Healthc Policy. 2021;14: 21–29. doi:10.2147/RMHP.S285289
13. Pinto VM, Basso CR, Gutierrez EB. Factors associated with sexually transmitted infections : a population based survey in the city of São Paulo , Brazil. : 2423–2432. doi:10.1590/1413-81232018237.20602016
14. Fikru Tesfaye,Mesfine Kassaye DK. community based survey of sexually transmitted disease syndromes in Adami_Tullu. Ethiop J Heal Dev. 2000.
15. Handebo S. Sexually transmitted infections related care - seeking behavior and associated factors among reproductive age women in Ethiopia : further analysis of the 2016 demographic and health survey. BMC Womens Health. 2020; 1–7. doi:10.1186/s12905-020-011459
16. Worku Dagnew G, Belachew Asresie M, Abeje Fekadu G. Factors associated with sexually transmitted infections among sexually active men in Ethiopia. Further analysis of 2016 Ethiopian demographic and health survey data. PLoS One. 2020;15: 1–11. doi:10.1371/journal.pone.0232793
17. Zhang X, Tezera D, Zou C, Wang Z, Zhao J, Gebremenfas E, et al. Industrial park development in Ethiopia. Case study report. Incl Sustain Ind Dev Work Pap Ser. 2018; 1–85.
18. Girmatsion F. Knowledge and Misconception of Young Women toward Sexual Transmitted Infection and Condom Use in Northern Ethiopia: Cross Sectional Study. J Public Heal Epidemiol. 2015;7: 138–144. doi:10.5897/jphe2014.0675
19. Martins DC, Pesce GB, da Silva GM, Fernandes CAM. Sexual behavior and sexually transmitted diseases among the female partners of inmates. Rev Lat Am Enfermagem. 2018;26. doi:10.1590/1518-8345.2568.3043
20. Fisseha G. Young Women Sexual Behaviour and Self-Reported Sexually Transmitted Diseases in Northern Ethiopia: A Cross Sectional Study. Eur J Prev Med. 2015;3: 55. doi:10.11648/j.ejpm.20150303.14
21. Fikru Tesfaye, Mesfin Kassaye DK. community based survey of sexually transmitted disease syndromes in Adami Tulu. Ethiop J Heal Dev. 2000;14: 7–12.