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STI Co-infection Among HIV/AIDS Patients at H. Adam Malik General Hospital, Medan, Indonesia

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Abstract. Both HIV/AIDS and Sexually Transmitted Infection (STI) are transmitted through sexual activites making a parallel port of entry making the two condition increase the each other's transmission which results as an impact to progression of HIV infection. This study aims to determine the characteristics of HIV/AIDS patients co-infected with sexually transmitted infections in H. Adam Malik General Hospital Medan between 2017 and 2018. This study is a descriptive observational study of 2422 HIV/AIDS patients attending H. Adam Malik General Hospital. Of those, 62 patients were diagnosed with STI coinfection. The majority of patients were male (85,5%) aged within the group of 25 – 49 years old (80,6%), had the level education of high school (88,7%), mostly were entrepreneurs (50%), and were single (59,7%). Most of the patients were already in their Stadium III (80,6%) clinical stage and had CD4+ count < 200/mm3 (51,6%). Condyloma acuminatum (35,5%) was found as the most common type of STI coinfection, and followed by Hepatitis B (33,9%).Based on anamnesis history, behavioral risk factors (66,1%) was the most frequent riskfactor

Keyword: HIV/AIDS, Co-infection, STI

Abstrak. *Adanya port of entry infeksi yang sejalan membuat keduanya saling meningkatkan risiko transmisi kemudian berpengaruh terhadap progresivitas infeksi HIV. Penelitian ini bertujuan mengetahui karakteristik pasien HIV/AIDS dengan koinfeksi menular seksual di RSUP H. Adam Malik Medan tahun 2017 – 2018. Penelitian bersifat deskriptif observasional dengan teknik pengambilan data secara total sampling.* Hasil menunjukkan diagnosis terbanyak dijumpai *HIV/AIDS dengan koinfeksi menular seksual* lebih banyak dengan jenis *kelamin laki-laki (85,5%), pada kelompok usia 25 – 49 tahun (80,6%), memiliki tingkat pendidikan SMA (88,7%), mayoritas bekerja sebagai wiraswasta (50%), dengan status marital terbanyak belum menikah (59,6%). Pasien dengan koinfeksi tersering dijumpai pada stadium klinis III (80,6%), dengan hitung CD4+ <200 (51,6%), jenis IMS Kondiloma akuminatum (35,5%), dan memiliki faktor risiko behavioral risk factors (66,1%)*

Kata Kunci: *HIV/AIDS, koinfeksi, Infeksi Menular Seksual*

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1 Introduction

Human Immunodeficiency Virus (HIV) is a retrovirus targeting the human's immune system, specifically any cells that express CD4+ markers on their surface such as T lymphocytes and eventually destroy their functions from both quantitative and qualitative degression [1], this condition induces patient's susceptibility towards other pathogens [2-4]. Acquired Immuno Deficiency Syndrome (AIDS) is a condition where diseases' manifestations have accumulated upon the malfunction of immune system as the impact of HIV infection [3]. HIV is one of the causes of mortality that continue to rise, within nearly three decades there has been a significant shift in rank of HIV prevalence, from 19th place in 1990 to 8th in 2017 [5]. During the same year, the estimated people infected with HIV in Indonesia have reached 640.000 [6].

Sexually transmitted infections (STI) belong to venereal diseases [2], a variety of clinical syndromes and infections caused by pathogens obtained and transmitted through sexual activity [7]. In the last decade, the incidence of HIV coinfected with STI has become a concern of public health issues [8]. In 2017, A total of 14.494 HIV/AIDS patients in Indonesia were diagnosed concurrently with STI [9]. The pathology mechanism acquired through the mucosal wall damage as well the weakened immune cells at the site of STIs infection, in which both mechanisms increase the risk to acquire HIV infection in STI patients. In contrast, local inflammatory process occurring in HIV patients with STI coinfection increases the transmission risk along with the effect on the effectiveness of therapy. These conditions justify the existence of a causal relationship between HIV infection and STI, where both can possibly aggravate each other [10].

2 Methods

This study is a retrospective cross-sectional study aimed to determine the characteristics of HIV/AIDS patients diagnosed with sexually transmitted co-infection at H. Adam Malik General Hospital Medan. The hospital is located in Medan City, North Sumatera Province, Indonesia. It is a referral hospital for the West Regional of Indonesia. The population study was HIV/AIDS patients coinfected with STI from 2017 to 2018. Data was collected from Medical Records Department of H. Adam Malik General Hospital Medan from August to November 2019. A total of 2422 patients diagnosed with HIV/AIDS were listed from the Electronic Medical Record (EMR). From this population, only 62 met the inclusion and exclusion criteria. The inclusion criteria included history of STI coinfection and those who were in aged between 15 and 49 years of age at the the time of diagnosis. Exclusion criteria was inadequate data on medical record. Variabel outcomes in this study were sociodemographic factors, type of STI, HIV clinical stage, CD4+ count, and risk factors.

3 Results

In 2017 and 2018, there were 2422 HIV/AIDS patients in H. Adam Malik General Hospital Medan, 62 of them met the inclusion and exclusion criteria. Table 1 shows the majority of subjects were male (85.5%) and only a small proportion was female (14.5%). Most of the sufferer were within the age group of 25 – 49 years (80.6%), while the least was in the age group of 15 – 19 years (1.6%). Most HIV-STI coinfection occurred in subjects with the minimum education level of Senior High School (88.7%), while only one subject was with Primary School education (1.6%). Thirty one of the subjects were working as entrepreneurs (50.0%) while one was a merchant (1.6%). From the study population, more than half were single (59.7%), and only one was a widow (1.6%).

Table 1 Sociodemographic factors distribution

No	Sociodemographic factors	Frequency (n)	Percentage (%)
1	**Sex**		
	Female	9	14.5
	Male	53	85.5
2	**Age (years)**		
	15 – 19	1	1.6
	20 – 24	11	17.7
	25 – 49	50	80.6
3	**Level of Education**		
	Primary School	1	1.6
	Junior High School	3	4.8
	Senior High School	55	88.7
	Bachelor Degree	3	4.8
4	**Occupation**		
	Housewife	7	11.3
	Entrepreneur	31	50.0
	Civil servant	3	4.8
	Merchant	1	1.6
	Private employees	7	11.3
	College student	6	9.7
	Unemployed	4	6.5
	Others	3	4.8
5	**Marital Status**		
	Married	24	38.7
	Single	37	59.7
	Widow	1	1.6

Table 2 presents the clinical stage when patient was first diagnosed with HIV/AIDS. The majority of patients was in their Stage III (80,6%) when the diagnosis was made, and only 6.5% was in their Stage II making it the least, and none was in their Stage I.

Table 2 Clinical Stage factors distribution

No	Clinical Stage	Frequency (n)	Persentase (%)
1	Stage I	0	0
2	Stage II	4	6.5

3	Stage III	50	80.6
4	Stage IV	8	12.9

On laboratory examinations, 51.2% of HIV/AIDS patients coinfected with STI had CD4+ count <200/mm^3 and only 3.2% had CD4+ > 500/mm^3 as shown in Table 3.

Table 3 CD4+ count distribution

No	CD4+ count	Frequency (n)	Percentage (%)
1	CD4+ > 500	2	3.2
2	CD4+ 200 – 499	28	45.2
3	CD4+ <200	32	51.6

Table 4 shows the patient's diagnosis based on medical history, most prevalent STI co-infection was Condyloma acuminatum (35,5%) and the least STI co-infection was Chlamydiosis (1,6%), and there were no Gonorrhea nor Trichomoniasis diagnosis found either.

Table 4 Types of STI Co-infection

No	STI Co-infection	Frequency (n)	Percentage (%)
1	Gonorrhea	0	0
2	Chlamydiosis	1	1,6
3	Syphilis	6	9,7
4	Trichomoniasis	0	0
5	Genital herpes	3	4,8
6	Condyloma acuminatum	22	35,5
7	Hepatitis B	21	33,9
8	Hepatitis C	5	8,1
9	Candidosis	2	3,2
10	Molluscum contagiosum	2	3,2

As seen on Table 5, this study found that the highest risk factor recorded was behavioral risk factors group (66.1%), and only 1.6% of health care behavior was related to risk factor. Behavioral risk factors including age at first intercourse, frequency of sexual intercourse, number of lifetime partners, addictions or IV drug use. High-risk Sex Practices such as anogenital intercourse, oro-anal intercourse, and oro-genital intercourse. High-risk Groups inclusive of health care worker and housewife. Table 6 shows the determinants of each STI.

Table 5 Risk factors distribution

No	Clinical Stage	Frequency (n)	Percentage (%)
1	Behavioral risk factors	42	67.7
2	High-risk sex practices	12	19.4
3	High risk group	8	12.9

Table 6 Distribution of STI Co-infection by Risk Factor

STI Co-infection	Risk Factor					
	Behavioral risk factors		High-risk sex practices		High risk group	
	n	%	n	%	n	%
Chlamydiosis	0	0	0	0	1	12.5
Syphilis	5	11.9	1	8.3	0	0
Genital herpes	3	7.1	0	0	0	0
Condyloma acuminatum	15	35.7	6	50	1	12.5
Hepatitis B	12	28.6	5	41.7	4	50.0
Hepatitis C	0	11.9	0	0	2	0
Candidiosis	5	0	0	0	0	25.0
Moluscum contagiosum	2	4.8	0	0	0	0

4 Discussion

As seen on table 1, male were more prevalent compared to woman. This is comparable to a study done in Ibadan, Nigeria, where STI coinfection were found in 24 male and 17 female patients [11]. However, one study done in Jimma University Specialized Hospital in Southwest, Ethiopia showed that out of 268 infected patients, 60.8% were female and only 39.5% were male [12]. This variation could be affected by different geographic location and cultural behavior. Most of the patients 50 (80.6%) were within the age group of 25 – 49 years, this shows an agreement with the HIV & STD Annual Report from the Republic of Indonesia Ministry of Health and Vora *et al.* study, where 69.6% of HIV infection distributed in the same age group and most STI cases (59.7%) were found in the 25 – 44 years age group [9, 13]. Gizaw & Ageze [12] study found the highest prevalence to be in within the age group of 15 – 30 years old.

The majority of patients had the education of Senior High School, this is comparable to a study done in M. Djamil General Hospital, Padang, Indonesia, using medical records of HIV infected patient, in which 51.4% had an educational background of Senior High School [14]. Inadequate knowledge regarding HIV transmission among the subjects with secondary level education may be attributed to the high prevalence among them [11].

From the study population, working as entrepreneur was the most common. This finding supports a study done in Pontianak, Indonesia, where 39.8% of the subjects worked as entrepreneur [15].

Regarding marital status, out of 62 patients, 24 (38.7%) were already married, but the highest prevalence was found among non-married or single subjects 37 (59.7%). However, this finding does not align with other studies, where prevalence was higher in married subjects [11, 16]

Among 62 patients, 80.6% of them were found in the WHO stage III and none were in their I Stadium of WHO classification. This finding is reciprocal with a study done by Gizaw and Ageze, where out of 137 HIV infected patients with skin manifestation, a few STI including *Moluscum contagiosum*, Genital Herpes, *Condyloma acuminatum*, Genital Candidiasis, Chancroid, and Lymphogranuloma Venereumwere were found in patients with WHO stage III (*n*=61), and 20 patients(14.6%) were in WHO stage II, while none were found in their stage I [12].

High prevalence of STI coinfection among HIV patients with CD4+ < 200 may be attributed to the pathology mechanism following CD4+ downturn. In a study done by Habibie & Barakbah in 2016, 46% of HIV patients with condyloma acuminatum had CD4+ count below 200 and only 4% among them had more than 350 CD4+ count by the time the diagnosis was made [17]. Buchacz K et al. [18], found a significant viral load escalation following a significant digression of CD4+ count in HIV/AIDS patients with Syphilis.

This study shows that Condyloma acuminatum as the most frequent STI coinfection found in HIV/AIDS patients who visited H. Adam Malik General Hospital in Medan. Hepatitis B came second in the numbers with only one patient less than Condyloma acuminatum. However, it is intriguing that neither Gonorrhea nor Trichomoniasis was diagnosed. This result is contrasting with a systematic review done by Kalichman, S et al. where the most common STI coinfection were Trichomoniasis (18.8%), Syphilis (9.5%), and Gonorrhea (9.5%) [10]. This variation may be due to region, gender, and risk group differentiation [16]. Prevalent Condyloma acuminatum coinfection is attributed to the low CD4+ count in HIV/AIDS patient, similar to a study in M. Djamil General Hospital where 60.9% HIV/AIDS patients with anogenital Condyloma acuminatum coinfection had CD4+ count ≤ 200/mm^3, whereas those without coinfection had CD4+ count >200/mm^3. From the same study, a significant correlation was found between CD4+ count and anogenital condyloma acuminatum event (p= 0,016) [19].

Hepatitis B co-occurrence in HIV/AIDS patient may be provoked through multifactorial mechanisms, including direct interaction of HIV and Hepatitis B Virus (HBV) on target cells such as hepatic stellate cell (HSC), Kupffer cell and hepatocyte, increased microbial translocation followed by lipopolysaccharide elevation in portal or systemic Kupffer cell, and the presence of HBV specific T-cell fatigue. In circumstance where HIV replication is no longer detected in liver, inflammation and fibrosis remain due to the binding of gp120 to CXC34 expressed by hepatocytes and HSC [20]. However, these STI co-infection diagnosis were included according to what was written on the medical records, meaning only symptomatic STI co-infection was being identified. This study does not provide information to the extent of every HIV/AIDS patient in the hospital -who met the inclusion and exclusion criteria- with asymptomatic STI co-infection.

The most frequent risk factor group was related to Behavioral Risk Factors, this includes risky sexual behavior and practice, use of syringes or tattooing. Risky sexual behavior was limited to heterosexual activity, including age at first intercourse, marital status, frequency of sexual intercourse, numbers of lifetime partners, rate and type of partners engaged in sexual intercourse and age difference between partners [22]. Unfortunately this study was limited to only differentiate heterosexual activity from homosexual activity which was considered part of high risk sex practices. Forty one patients (66.1%) had history of behavioral risk factors, 38 were due to sexual activities, 2 patients with history of Intravenous Drug Use (IDU)-with one of them was an accidental injection as a health care worker whilst throwing used syringe, and one last patient had tattoo. Heterosexual activity was the most common risk found in patients with behavioral risk factors, consistent with Vora *et al* study and a report by WHO SEARO [3] [21]. As described in Table 5, notwithstanding, the least common group was those who were considered as High-risk Groups (12,9%), they were all wives of an HIV positive husband. The remaining HIV-STI coinfected patients were individuals with history of High-risk Sex Practices, 10 were homosexual and 2 were bisexual. However, other determinants that could contribute to the entry of STI co-infection were not observed in these patients.

5 Conclusions

This study shows that the most common STI co-infection found among people living with HIV/AIDS was Condyloma acuminatum. Most were found in the WHO Stage III when the diagnosis was made. Having behavioral risk factors were the most frequent factor to acquire HIV and STI. However, data collected from the medical records did not have detailed information and updated, laboratory tests results were also not timely specific. A prospective study may optimize results regarding patient's history of determinants and accurate course of disease as the main limitations in this study include data incompleteness in the medical records. Clinicians and other healthcare workers are responsible for the medical records and they should be encouraged to better record and detailed information per patient's visit, likewise encouraging HIV/AIDS patients to do STI check-up regularly.

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