Prevalance of HPV Infection in Women Living with HIV Attending Waibargi Specialist Hospital in Myanmar

Khin May Thin, Myint Myint Thinnv, Sabai Phyu, Hsu Myat Mon, Thinn Myat Myat Shein & Myat Theingi Kyaw

University of Medicine 1

ABSTRACT

Cervical cancer remains a significant public health concern, particularly for women living with HIV (WLWH), due to their increased susceptibility to persistent human papillomavirus (HPV) infections.

This study aims to assess the prevalence of high-risk HPV (hrHPV) infections in WLWH attending Waibargi Specialist Hospital in Myanmar in the year 2024. The cross-sectional analysis involved 234 WLWH, tested with Cobas 4800 system HPV DNA test. Colposcopy directed biopsies were conducted among the participants to detect the presence of cervical intraepithelial neoplasia (CIN) and invasive carcinoma.

Keywords: cervical cancer, CIN, HIV, HPV, screening, WLWH, ART, colposcopy.

Classification: NLM Code: WC 555

Language: English

Great Britain Journals Press

London Journal of Medical & Health Research

Volume 25 | Issue 7 | Compilation 1.0

Prevalance of HPV Infection in Women Living with HIV Attending Waibargi Specialist Hospital in Myanmar

Khin May Thin[α], Myint Myint Thinnv[σ], Sabai Phyu[ρ], Hsu Myat Mon[ↀ], Thinn Myat Myat Shein[¥] & Myat Theingi Kyaw[χ]

ABSTRACT

Cervical cancer remains a significant public health concern, particularly for women living with HIV (WLWH), due to their increased susceptibility to persistent human papillomavirus (HPV) infections.

This study aims to assess the prevalence of high-risk HPV (hrHPV) infections in WLWH attending Waibargi Specialist Hospital in Myanmar in the year 2024. The cross-sectional analysis involved 234 WLWH, tested with Cobas 4800 system HPV DNA test. Colposcopy directed biopsies were conducted among the participants to detect the presence of cervical intraepithelial neoplasia (CIN) and invasive carcinoma.

The results revealed a high HPV prevalence of 29.9% among the study population, with 70 women tested positive for one or more high-risk HPV types. Among those, single infection with HPV 16 was found in 9 women (3.8%), HPV 18 in 8 (3.4%) while 35 (15%) of them were infected with other high-risk HPV types. Additionally, 18 women (7.7%) had mixed infections involving multiple hrHPV types.

The study also identified that women on ART for more than three years exhibited significantly lower HPV infection rates, as did those with undetectable viral loads, suggesting that effective HIV management can mitigate HPV-related cervical cancer risk.

In this study, 41 women (70.7%) out of 58 HPV-positive cohort diagnosed with CIN I or more severe histological abnormalities after colposcopy directed biopsy. Notably, 86.7% of patients with HPV 16, 18, or mixed infections had positive histology results, compared to 53.6% in those with other hrHPV.

In conclusion, this study highlights the high prevalence of hr HPV infections in WLWH compared to general population (29,9% vs 4 - 11%)in Myanmar as well as the association between specific HPV genotypes and the development of cervical pre cancer and cancer among WLWH. The study also emphasizes the need for integrated cervical cancer screening and vaccination programs within HIV frameworks along with the importance of proper HIV treatment. However, since it is a hospital-based study, further research is required to cover the broader populations, particularly in rural and underserved areas of Myanmar.

Keywords: cervical cancer, CIN, HIV, HPV, screening, WLWH, ART, Colposcopy.

1. Department of Obstetrics and Gynaecology, Yangon Central Women's Hospital, Yangon, Myanmar.
2. Department of Tropical & Infectious Disease Waibargi Specialist Hospital, Yangon, Myanmar.

Author α: Principle investigator, Professor and Head (Rtd.), Department of Obstetrics and Gynaecology. University of Medicine 1, Yangon.
σ: Principle investigator, Senior Consultant/Associate Professor. Department of Gynaecologic Oncology. Central Women's Hospital, Yangon.
ρ: Professor and Head. Tropical & Infectious Disease Department, Waibagi Specialist Hospital. University of Medicine 2, Yangon.
ↀ: Junior Consultant Gy/Oncologist, Department of Gynaecologic Oncology. Central Women's Hospital, Yangon.

¥: Junior Consultant Gy/Oncologist, Department of Gynaecologic Oncology. Central Women's Hospital, Yangon.
χ: Specialist Assistant Surgeon, Department of Gynaecologic OncologyCentral Women's Hospital, Yangon.

I. INTRODUCTION

The incidence of cervical cancer has been changed in various parts of the world, after the knowledge of persistent infection with Human Papillomavirus (HPV) is the main cause of this deadly cancer. This noble finding leads to the development of HPV tests as well as various triage strategies to detect premalignant lesions of cervix and various treatment strategies.

Although cervical cancer is a largely preventable disease, it is still one of the leading causes of cancer death of women in developing countries. In Myanmar, according to GLOBOCAN 2022, cervical cancer becomes the second most common cancer among women with estimated age standardized incidence rate of 21.4 per 100,000 female population per year (Ferlay et al,2024). According to that data Myanmar ranked third after Indonesia and Maldives in cervical cancer incidence and mortality. Although Myanmar started to implement cervical cancer prevention and control program in National Health Plan since 2018, there are still some difficulties and limitations to screen and give proper management to those high risk populations.

Since the progression to precancerous lesion of cervix in HPV infected person largely depends on their immune status, women living with HIV (WLWH) have higher risk of HPV infection along with development of high-grade intraepithelial lesions and cervical cancer than the general population. Moreover, the lifespan of WLWH has increased after introduction of Highly Active Anti-Retroviral Therapy (HAART); yet there is a prolonged risk of exposure to HPV putting them at higher risk for cervical cancer.

However, for WLWH, access to the cervical cancer screening and treatment facilities are relatively out of reach compared to the general population around the world. In Myanmar, there are very limited data related to the prevalence of HPV infection as well as cervical cancer screening facilities for women living with HIV.

For low-to middle-income countries (LMICs), the World Health Organization (2014) recommends HPV testing as the preferred choice for cervical cancer screening. By detecting the presence of HPV infection among WLWH, it would prevent rapid progression to cervical cancer in those high risk women.

Therefore, for WLWH, HPV based cervical cancer screening is an essential measure for their health care which should be implemented in Myanmar while collecting the HPV positive and cervical pre cancer rates are the fundamentals beforehand.

This study aims not only to assess the prevalence and subtypes of HPV infection and to evaluate the presence of cervical precancerous lesions among WLWH in Myanmar but also to inform and enhance the national cervical cancer screening programme.

II. AIM AND OBJECTIVES

The study was conducted to determine the prevalence of HPV infection in women living with HIV attending Waibargi Specialist Hospital. This study identified the social and demographic characteristics of study population and also determined the rate of HPV positive cases and precancerous lesion of cervix in those women. Precancerous lesions of the cervix among those HPV positive cases of study population were also identified.

II. STUDY DESIGN AND METHOD

It was a hospital based cross sectional study which carried out in Waibargi Specialist Hospital, Cervical cancer screening clinic, colposcopy clinic and pathology department of Central Women's Hospital, Yangon, Myanmar.

Study population was all eligible women with HIV infection in 25 to 55 years' age group attended the Waibargi Specialist Hospital in the year 2024. Women who were eligible in term of the inclusion and exclusion criteria were recruited and explained about study procedure in details.

Written consent and relevant history were taken from the participants. Altogether 234 eligible WLWH were included in this particular study.

Self-collected samples for HPV genotyping were taken with FOLQSwabs after thorough explanation and demonstration of the collection method. Collected samples were sent to the laboratory and analysed with Cobas 4800 system. HPV positive cases were examined with colposcopy and directed cervical biopsy in colposcopy clinic of Central Women's Hospital, Yangon to detect the presence of cervical precancerous lesion. All colposcopy directed biopsy tissue samples were sent to pathology department, CWH for histological confirmation.

Women who had precancerous lesion were treated mainly with LLETZ surgery while more advance cases were treated with hysterectomy, radical hysterectomy and/or radiotherapy.

III. RESULTS

Table 1: Demographic Characteristics of Study Population (N= 234)

Demographic Characteristics	Frequency	Percent
Age		
21 to 30 years	44	18.8
31 to 40 years	88	37.6
41 to 50 years	92	39.3
51 to 60 years	10	4.3
Education		
Illiterate	10	4.3
Primary	38	16.2
Middle	61	26.1
High	71	30.3
Up to collage/ University	8	3.4
Graduate	46	19.7
Smoking		
No	212	90.6
<5 /days	19	8.1
≥5 /days	3	1.3
Age at sexual exposure		
13 to 19 years	72	30.8
20 to 29 years	126	53.8
30 to 39 years	33	14.1
≥40 years	3	1.3
HPV vaccination		
Yes	4	1.7
No	230	98.3
Total	234	100
History of screening		
Yes	19	8.1
No	215	91.9
Total	234	100

Age distribution of the study population ranged from 25 to 55 years, with a mean (SD) age of 39 (8.09) years and a median age of 39 years. The most common age group was 41 to 50 years, representing 39.3 percent (92/234), followed by 31 to 40 years, which accounted for 37.6 percent (88/234). Only 4.3 percent (10/234) were over 50 years.

The participants had diverse educational backgrounds. Among them, 4.3% (10 out of 234) were illiterate, while 3.4% (8 out of 234) had attended but not completed college or university. Notably, 19.7% (46 out of 234) were university graduates.

Regarding smoking habits, 90.6% (212/234) of the participants were non-smokers. A smaller

portion, 8.1% (19/234), smoked fewer than 5 cigarettes per day, while 1.3% (3/234) smoked 5 or more cigarettes per day.

The age of first sexual exposure among participants ranged from a minimum of 13 years to a maximum of 41 years, with a mean (SD) age of 23.03 (5.55) years. A significant portion, 30.8% (72/234), experienced sexual exposure between the ages of 13 and 19 years. The majority, 53.8% (126/234), were exposed between 20 and 29 years. Those exposed between 30 and 39 years accounted for 14.1% (33/234), while only 1.3% (3/234) were exposed at 40 years or older.

Concerning the HPV vaccination, only 4 participants (1.7 percent) had vaccinated HPV vaccine. Majority were not vaccinated for HPV infection. Only 8.1% (19/234) of study population reported to have cancer screening experience.

Table 2: Distribution Participants Regarding the HIV Infection, Treatment and Cervical Cancer Prevention

	Frequency	Percent
Viral Load		
Detected	24	10.3
Not detected	171	73.0
Not done	39	16.7
Total	234	100
ART		
Yes	*207*	*88.5*
No	*6*	*2.6*
Defaulter	*21*	*9.0*
Total	*234*	*100*
Duration of ART		
<1 year	2	0.9
1 year	43	18.9
2 years	37	16.2
3 years	45	19.7
>4 years	101	44.3
Total	228	100

Regarding the viral load, 24 participants (10.3 percent) still had detectable virus in their blood, while 171 participants (73 percent) had an undetectable viral load. The remaining 39 participants (16.7 percent) had not yet been examined for viral load.

Among the 234 participants, 207 (88.5 percent) were on ART, and 21 (9 percent) were defaulters. The remaining 6 participants (2.6 percent) had not yet started ART. Among the 228 participants on ART, about half were treated with ART for more than 4 years and only 2 participants (0.9 percent) were less than one-year duration.

Table 3: Distribution of HPV Genotype

HPV Genotype	Frequency	Percent
Negative	164	70.1
16 positive	9	3.8
18 positive	8	3.4
other high risk group positive	35	15.0
Mixed infection	18	7.7
Total	234	100.0

Table 4: Findings of Overlapping HPV Genotypes

HPV Genotype	Frequency	Percent
Negative	164	70.1
16 positive	9	3.8
16 positive+18 positive	1	0.4
16 positive+18 positive + other high risk group positive	1	0.4
16 positive + other high risk group positive	9	3.8
18 positive	8	3.4
18positive + other high risk group positive	7	3.0
other high risk group positive	35	15.0
Total	234	100.0

The distribution of HPV genotypes among the 234 women in the study shows that the majority were tested negative for HPV, with 164 women falling into this category. A smaller group of 9 women tested positive for HPV 16, and 8 women tested positive for HPV 18. Additionally, 35 women were found to be positive for other high-risk HPV types, and 18 women had mixed infections involving multiple HPV genotypes.

When looking at mixed infections, one woman had both HPV 16 and 18, while another had a combination of HPV 16, HPV 18, and other high-risk HPV types. Nine women had HPV 16 in conjunction with other high-risk types, and seven women had HPV 18 along with other high-risk types. In this study out of 70 HPV positive cases, 35 women (50%) were infected with HPV subtypes other than 16/18.

Table 5: Distribution of Histology Result after Colposcopy

Histology Result	Frequency	Percent among Total	Percent Among Colposcopy Done
Negative (non-malignant)	17	7.3	29.3
CIN I (LSIL)	16	6.8	27.6
CIN II (HSIL)	14	6.0	24.1
CIN III(HSIL)	6	2.6	10.3
Carcinoma in situ	2	0.9	3.4
Invasive	3	1.3	5.2
Not done	176	75.2	
Total	234	100.0	

Out of 70 women with positive HPV results, 58 underwent colposcopy. Among these, 17 women (7.3%) had negative or non-malignant results. Low-grade lesions (CIN I) were found in 16 women (6.8%), while CIN II and CIN III (HSIL) were detected in 14 women (6.0%) and 6 women (2.6%) of the total population, respectively. A smaller percentage were diagnosed with carcinoma in situ (2 women, or 0.9%) and invasive cancer (3 women, or 1.3%). Among the 58 women who had colposcopies, a notable proportion were diagnosed with HSIL, with 24.1% having CIN II and 10.3% having CIN III.

Table 6: Demographic Characteristics of and HPV Genotype (n=234)

Demographic Characteristics	HPV Negative n (%)	HPV Positive n (%)	OR (95%CI)	P value
Age				
21 to 40 years	90 (68.2)	42 (31.8)	0.81	0.469
41 to 60 years	74 (72.5)	28 (27.5)	(0.46,1.43)	
Education				
Middle school & below	78 (71.6)	31 (28.4)	1.14	0.646
High school & above	86 (68.8)	39 (31.2)	(0.65,2.00)	
Smoking				
Yes	16 (72.7)	6 (27.3)	1.15	0.776
No	148 (69.8)	64 (30.2)	(0.43,3.08)	
Age at sexual exposure				
13 to 19 years	49 (68.1)	23 (31.9)	0.87	0.651
≥20 years	115 (71.0)	47 (29.0)	(0.48,1.59)	

Table (6) presents the demographic characteristics of the study participants in relation to their HPV genotype status (n=234). Among different age groups, 31.8% of women aged 21–40 and 27.5% of those aged 41–60 tested HPV positive, with no significant difference observed (OR 0.81, 95% CI: 0.46–1.43, p=0.469). Educational level, smoking status, and age at sexual debut also showed no statistically significant association with HPV positivity. Overall, none of the demographic variables demonstrated a significant correlation with HPV infection in this study population.

Table 7: Association Between Clinical Characteristics Regarding HIV Infection, Treatment, Screening History and HPV Positive Result

Clinical Characteristics	HPV Negative n (%)	HPV Positive n (%)	OR (95% CI)	P Value
Duration of treatment				
No/ Defaulter	15 (55.6)	12 (44.4)	3.75(1.48,9.52)	0.003
≤3 years	74 (63.8)	42 (36.2)	2.66 (1.38,5.14)	
>3 years	75 (82.4)	16 (17.6)	Ref	
VDRL				
Positive	29 (69.0)	13 (31.0)	0.94	0.871
Negative	135 (70.3)	57 (29.7)	(0.46,1.94)	
Viral load (n=195)				
Not detected	127 (74.3)	44 (25.7)	2.44	0.040
Detected	13 (54.2)	11 (45.8)	(1.02,5.85)	
Previous screening history				
Yes	12 (63.2)	7 (36.8)	0.71	0.491
No	152 (70.7)	63 (29.3)	(0.27,1.89)	

Compared to ART treatment of longer duration (>3 years), treatment of shorter duration was 2.66 times more likely to result in HPV infection, and patients who received no treatment or were defaulters were 3.75 times more likely to have an HPV infection, with a p-value of 0.003. There was no significant association between VDRL test results, history of previous screening, and HPV results.

Out of 234 patients, 195 were examined for viral load. Among the 24 patients with detectable viral load, 11 (45.8%) had a positive HPV result, while among the 171 patients with undetectable viral load, 44 (25.7%) had a positive HPV result. There was a significant association between viral load and HPV results, with a p-value of 0.040. Patients with detectable viral load were 2.44 times more likely to get an HPV infection than those with undetectable viral load.

Association between demographic characteristics of study population and HPV positive result was calculated in this study but there was no significant association between age, education, smoking status and HPV result.

Table 8a: Association between Distribution of HPV Genotype and Histology Result (N=58)

HPV Genotype	Negative	CIN I to Invasive	Fisher's exact test	P Value
16 positive	1 (14.3)	6 (85.7)	7.023	0.058
18 positive	1 (16.7)	5 (83.3)		
other high risk group positive	13 (46.4)	15 (53.6)		
Mixed infection	2 (11.8)	15 (88.2)		
Total	17 (29.3)	41 (70.7)		

Table 8b: Association between Distribution of HPV Genotype in Group and Histology Result (N=58)

HPV Genotype	Negative	CIN I to Invasive	OR (95% CI)	P value
Other High-Risk Group Positive	13 (46.4)	15 (53.6)	5.63 (1.55,20.43)	0.009
16+, 18+, mix Infection	4 (13.3)	26 (86.7)		
Total	17 (29.3)	41 (70.7)		

Among the 30 WLWH with HPV type 16, type 18, or mixed infections, 26 (86.7%) had positive histology results (CIN I and greater). However, among the 28 patients with other high-risk group infections, 15 (53.6%) had positive histology results. Women in HPV type 16, 18, or mixed infections group were 5.63 times more likely to have positive histology results than those with other high-risk group infections. There was a significant association between HPV genotype and histology results among HIV-positive patients, with a p-value of 0.009.

Table 9a: Association between Distribution of Individual HPV Genotype and Histology Result (N=58)

HPV Genotype	Negative/CIN I n (%)	CIN II to invasive n (%)	Fisher's exact test	P value
16 positive	3 (42.9)	4 (57.1)	7.410	0.055
18 positive	2 (33.3)	4 (66.7)		
other high risk group positive	21 (75.0)	7 (25.0)		
Mixed infection	7 (41.2)	10 (58.8)		
Total	33 (56.9)	25 (43.1)		

Table 9b: Association between Distribution of Individual HPV Genotype and Histology Result (n=58)

HPV Genotype	Negative/CIN I n (%)	CIN II to Invasive n (%)	OR (95% CI)	P Value
other high-risk group positive	21 (75.0)	7 (25.0)	4.5 (1.46,13.86)	0.007
16+, 18+, mix infection	12 (40.0)	18 (60.0)		
Total	33 (56.9)	25 (43.1)		

Among the 30 women with HPV type 16, type 18, or mixed infections, 18 (60 %) had CIN II to invasive histology results. However, among the 28 patients with other high-risk group infections, 7 (25.0%) had CIN II and above lesions. Women in HPV type 16, type 18, or mixed infections positive group were 4.5 times more likely to have CIN II to invasive histology results than other high-risk positive group. There was a significant association between HPV genotype and histology results among HIV-positive patients, with a p-value of 0.007.

IV. DISCUSSION

Cervical cancer is the second most prominent gynaecological cancer endangering life of Myanmar women caused primarily by the human papilloma virus which is more prevalent in immunocompromised individuals. Sample collections took place in Waibargi Specialist Hospital, Yangon among eligible women living with HIV aged between 25 to 55 years and altogether 234 of them were recruited for the study. Their sociodemographic characteristics especially risk factors for the development of cervical cancer, HIV infection and treatment related variables were studied as well.

This study, conducted at Waibargi Specialist Hospital in Yangon, involved 234 HIV-positive women aged 25 to 55 years. It examined their sociodemographic characteristics, risk factors for cervical cancer, and aspects related to HIV infection and treatment. Around 40% of participants were in their 40s, and nearly half had completed high school or higher education, which could suggest a relatively informed population regarding health issues. However, despite a low prevalence of smoking and other typical risk factors, one-third of the participants had early sexual debut, a known risk factor for HPV and cervical cancer.

Alarmingly, the uptake of preventive measures was very low: only 8.1% had ever undergone cervical cancer screening and a mere 1.7% had received the HPV vaccine. Vaccination coverage of this study was much lower than that of the Puerto Rico study where 14.7% of WLWH were vaccinated (Soto-Salgado et al, 2025). This finding highlights a significant gap in the implementation of cervical cancer prevention for those high-risk population in HIV care services.

In terms of HIV management, the majority (88.5%) were on antiretroviral therapy (ART), and 73% had undetectable viral loads within the past year, indicating effective treatment adherence. Many had long-term ART experience, with some on treatment for nearly two decades. This reflects a commendable level of HIV care and engagement.

Although the study population demonstrates strong engagement with HIV care, including high ART adherence and viral suppression, the uptake of cervical cancer preventive measures remains relatively low. This suggests a need for further enhancement in the integration of cervical cancer screening within existing HIV clinics with excellent care frameworks. Despite being engaged in regular healthcare for HIV, these women are not being adequately screened or protected against HPV and cervical cancer. The lack of preventive measures among an otherwise health-engaged population suggests that barriers may be more structural (such as lack of service integration like provider education, community outreach, streamlined services and financial

assistance) than personal. These findings indicate that expanding access and awareness of cervical cancer prevention within HIV care settings could be beneficial. Strengthening coordination between HIV clinics and reproductive health services would support a more holistic approach to women's health, particularly in high-risk populations.

As regards to HPV infection among study population, 70 (29.9%) out of 234 HIV positive women tested positive for one or more of high risk HPV infection with Cobas HPV test. HPV 16 was found in total 20(8.4%) women while 9 of them had mixed infection with other hrHPV, one woman was 16 and 18 positives and another one was tested positive for 16, 18 and other hrHPV infection. HPV 18 was found in 16 (6.8%) cases including 8 mixed infections. The rest of the positive women i.e. 35 (15%) cases had other high risk HPV infections. Mixed infection was found in 18 women (7.7%) out of 234 total study participants.

According to hospital records, the HPV positivity rates among women attending the Cervical Cancer Screening Clinic at Yangon Central Women's Hospital were 10.15% in 2017, 11.02% in 2018, and 11.32% in 2019 (YCWH statistics,2017,2018,2019). In comparison, meta-analyses have estimated the prevalence of HPV infection among the general female population aged 18–65 years in community-based settings in Myanmar to be approximately 4% (95%CI: 3–5%) (Win et al, 2025). The HPV positivity rate among women living with HIV in the present study appears to be substantially higher than that of the general population in Myanmar.

Since women living with HIV (WLWH) have a substantially higher risk of acquiring HPV infection compared to the general adult female population (Clifford et al., 2005; Grulich et al., 2007; Bratcher and Sahasrabuddhe, 2010), the prevalence of HPV infection in WLWH is approximately seven times greater than in HIV-negative women (Womack et al., 2000). So also in this study, HPV positive rate was nearly 30% which was three times higher than that of hospital statistics (29.9% vs round about 11%) in Yangon Central Women's Hospital while it was seven fold greater than general population (29.9% vs 4%).

In the SHADE study conducted in Denmark in 2011, high risk HPV infection was positive in 26.4% out of 334 WLWH, in contrary to women in general population where only 16.6% were HPV positive cases. That study also revealed higher number of multiple or mixed infection compared to general population (38.55% versus 25.7%) with HPV 58 (7.1%) being the highest followed by 52 (5.4 %), and 16 (4.8 %) in WLWH (Thorsteinsson et al, 2016).

Therefore, HPV positive rate of WLWH attending Waibargi Specialist Hospital seems not much higher than the Denmark study (29.9% versus 26.4%). However, the study population did not represent all HIV positive women throughout the whole country since this present study delineate more of the urban population though health care facilities for WLWH might be limited in hard to reach or border areas where high risk behaviour were more common.

In an Egyptian study published in 2024, the overall prevalence of HPV infection was 13.5% for all women whereas 24.4% among WLWH denoting those women are 6 times at greater risk of developing cervical cancer. Moreover, hrHPVs other than genotype 16 and 18 were isolated from 71% of infected women (Ashry et al, 2024). Another analytical cross-sectional study from Ghana revealed as the prevalence of hr-HPV among WLWH was 44.4% and 46.8% of positive women found to have multiple HPV genotypes (Agyare Gyane et al,2024).

In the current study, all the HPV positive cases were arranged to do colposcopy examination in the Cervical Cancer Screening Clinic of Yangon Central Women's Hospital. Unfortunately, 12 women failed to show up for colposcopic examination for various reasons. Therefore, those women were arranged to visit their corresponding township hospitals to undertake visual assessment tests with VIA and/or VILI tests and treated according to national guideline (MRH,

2018). After colposcopy and directed biopsy of 58 HPV positive women, CIN I was diagnosed in 16 women (6.8%), CIN II in 14 (6.0%), CIN III in 6 (2.6%), in situ carcinoma in 2 (0.9%) and invasive carcinoma in 3 (1.3%) of the total study population.

In this study, association between HPV positive results and sociodemographic characteristics of the participants, clinical characteristics including marital status and number of pregnancies as well as HIV infection and treatment conditions were analysed. There was no statistically significant association between sociodemographic factors and the HPV infection in WLWH attending Waibargi Hospital. Age of first sexual exposure, marital status, number of marriages, number of pregnancies, previous screening histories and presence of other sexually transmitted infections were also not associated to the presence of HPV infection.

Duration of anti-retroviral therapy and HIV viral load were the significant associated factors for HPV infection in WLWH. HIV positive women who have been taking ART for more than 3 years has significantly lower HPV infection than those with ART of less than 3 years. Similarly, HIV viral load has significant association for HPV infection showing significantly lower HPV positive rate in women with undetectable HIV viral load i.e. 25.7% vs 45.8%, OR 2.44 (1.02-5.8) with p value 0.040. This means patients with detectable viral load were 2.44 times more likely to get an HPV infection than those with undetectable viral load.

In this current study, not only the CIN II+ disease but also all the CIN I cases were regarded as positive lesions for treatment since those women have had HIV infection which may lead to a rapid progression of the disease. Moreover, many of the participants seems not affordable or possible for further repeated follow up visits to YCWH. Therefore, all the HPV positive cases and CIN I and higher cases were offered screen, triage and treat option as well as screen and treat option to reduce the burden of repeated follow up visits according to the WHO guideline (WHO, 2021).

Association between the different groups of positive HPV genotypes and positive histology results were also analysed in this study. There was no significant association between the presence of histologically confirmed premalignant cervical lesions, considering both CIN I+ or CIN II+ and specific HPV genotypes individually. However, in women with hrHPV 16, 18 and mixed infection group, CIN I+ lesions were found in 85%, 83.3 % and 88.2% respectively whereas 53,6% of other high risk group had CIN I+ cases (p-0.058). On account of higher grade pre cancer for different genotype groups, CIN II+ lesions were reported in 57.1%, 66.7%, 25.0% and 58.8% for HPV 16, 18, other high risk and mixed infection groups respectively (p- 0.055)..

The results indicated that a relatively higher proportion of histologically confirmed abnormal lesions occurred in women who were positive for HPV 16 or 18 as well as a statistically significant difference was observed when comparing the prevalence of both CIN I+ and CIN II+ lesions between those with other high-risk HPV types and those with HPV 16, 18, or mixed infections. Further analysis of CIN grade distribution revealed that 43.1% of HPV-positive women had CIN II or more severe lesions. Specifically, 60% of women with HPV 16, 18, or mixed infections presented with CIN II to invasive carcinoma, compared to 25% of those with other high-risk HPV types.

Although these results still denote the risk of premalignant lesion and malignant lesion are higher with HPV 16 or 18 infection, the possibility of disease in other high risk group is not negligible. Among 70 HPV positive women, 35 (50%) of them found to be infected with other hrHPV without 16 nor 18. CIN I+ lesions were reported in 15 women (36.58%) from other hrHPV positive group out of total 41 CIN I and above lesions as well as 9 women (33.33%) out of 27 CIN II and above cases were from other high risk group. Two cases of carcinoma insitu were diagnosed from those other hrHPV positive group too. These findings high light the changing trend of HPV infection and occurrence of premalignant lesion of cervix in recent years.

HPV types 16 and 18 are well established as the primary causes of cervical cancer, responsible for approximately two third of cases, while nearly all cervical cancers (around 99%) are associated with HPV infection (Bruni et al., 2010). In this study, there was no statistically significant difference indicating that precancerous lesions were more likely to be associated with isolated HPV 16 or 18 infections (table 6a and 7a), although the proportion of CIN I and above lesions was lower in the group with other high-risk HPV types (53.6%) while it was over 80% in HPV 16, 18, or mixed infections group.

In Southeast Asia, including Myanmar, approximately 3% of women in the general population are estimated to carry cervical HPV types 16 or 18 at any given time, and these two types are responsible for around 70.4% of invasive cervical cancer cases (Bruni et al, 2023). Conversely, in this study WLWH have much higher HPV positive rate along with different trend of HPV genotype other than 16/18 which prompt to consider separate screening and treatment plans for precancerous lesions as well as vaccination programs for WLWH.

In Myanmar, according to HIV/AIDS data hub for the Asia- Pacific region, in 2023 about 280,000 people were estimated to have HIV infection while 216,757 (77%) of them were under ART coverage. There might have been many more undiagnosed cases in the vulnerable groups who are out of access to the health care facilities. HPV infection and presence of precancerous lesions may be much higher in those women without antiretroviral treatment because of the findings of the study indicates that duration of ART and the undetectable viral loads are the significant protective factors for HPV infection.

Women living with HIV have an increased likelihood of acquiring high-risk HPV 16 and 18, as well as multiple HPV infections compared to HIV-negative women (Sun et al., 1997). Mixed infections were found in 18 women (7.7%) in this current research and one woman had had multiple infection i.e.16, 18 along with other hr HPV and she was diagnosed as CIN III disease.

In 2022, Seyoum et al carried out a meta-analysis for prevalence and genotype distribution of high-risk human papillomavirus infection among sub-Saharan African women. Their study revealed that the pooled distribution of HPV 16, 52, 18, 56, and 58 genotypes have been slightly different in different regions. In South Africa, HPV 58 was the most commonly detected type, followed by HPV 52, 45, 16, and 18. Similarly, in Mozambique HPV 52 is the most common genotype, followed by HPV 35 and 16. Furthermore, Mayaud et al (2003) also stated that in women living with HIV, HPV58 has been proven to be the second leading cause of cervical cancer after HPV 16.

In this study, among the 70 HPV-positive cases, 35 (50%) were infected with high-risk HPV types other than genotypes 16 and 18. Therefore, for women living with HIV, prompt interventions including referral for colposcopy and timely treatment should be provided even when non-16/18 high-risk HPV types are detected. Additionally, these findings should be reflected in vaccination strategies for this vulnerable population, including consideration of the use of the vaccines which could cover more HPV subtypes.

This study for HPV genotyping was performed with Cobas 4800 system, which categorizes results into HPV 16, HPV 18, and other high-risk groups. Future research should focus on tests capable of identifying individual high-risk HPV genotypes. As this was a hospital-based study, similar studies are warranted in community settings, particularly among high-risk groups of women like WLWH, to better understand the prevalence of HPV infection. Additionally, this study adopted self-collection technique to get the vaginal samples, demonstrating satisfactory performance and supporting the potential for broader use of this method to enhance screening coverage in community-based programs.

V. CONCLUSION

In Myanmar, given the significant number of HIV positive women, there is also high burden of cervical cancer. So, it is important to identify HPV infection early through targeted screening among

HIV positive women. In Myanmar, data on this topic is limited; however, figures collected at Waibargi Hospital show a much higher HPV positivity rate of 29.9%, compared to 4–11% in the general population.

Among HPV positive women, about half of them had precancerous lesions. Moreover, high risk HPVs other than 16 and 18 account for 50% of positive cases and also caused a noticeable percent of high grade lesions. However, since this was a hospital based cross sectional study, it does not indicate the information for the general population and thus further studies should be done especially for high risk groups in the society. These findings underscore the urgency of integrating HPV-based screening into existing HIV care programs and revising the preventive measures to consider high- risk HPV types beyond 16 and 18.

REFFERENCE

1. Agyare Gyane F, Modey E, Maya E, Bonney EY, Abaidoo-Myles A, et al. (2024) Prevalence and risk factors associated with high-risk human papillomavirus infection among women living with HIV (WLWH) a a tertiary health facility in Accra, Ghana. PLOS ONE 19(5): e0303535. https:// doi.org/10.1371/journal.pone.0303535
2. Ashry M, Shawky S, Mounir Z, Fathy F, Elsayed H, Kamal W, Hassany M. Prevalence and risk factors of human papilloma virus infection among women living with HIV, Egypt, a cross sectional study. BMC Public Health. 2024 Jul 9;24(1):1821. doi: 10.1186/ s12889-024-19240-z. PMID: 38978047; PMCID: PMC11232173.
3. Bratcher, L. F., & Sahasrabuddhe, V. V. (2010). The impact of antiretroviral therapy on HPV and cervical intraepithelial neoplasia: current evidence and directions for future research. *Infectious agents and cancer*, *5*, 8. https://doi.org/10.1186 /1750-9378-5-8
4. Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, Muñoz J, Bosch FX, de Sanjosé S. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Myanmar. Summary Report 10 March 2023. [Date Accessed]
5. Bruni L, Diaz M, Castellsagué M, Ferrer E, Bosch FX, De Sanjosé S. Cervical human papillomavirus prevalence in 5 continents: meta-analysis of 1 million women with normal cytological findings. J Infect Dis. (2010) 202:1789– 99. doi:10.1086/ 657321
6. Clifford, G., & Franceschi, S. (2005). HPV in sub-Saharan Africa. *Papillomavirus Report*, *16*(5), 322–326. https://doi.org/10.1179/09 5741905X49 089
7. Ferlay J, Ervik M, Lam F, Laversanne M, Colombet M, Mery L, Piñeros M, Znaor A, Soerjomataram I, Bray F (2024). Global Cancer Observatory: Cancer Today. Lyon, France: International Agency for Research on Cancer. Available from: https:// gco.iarc. who. int/today, accessed [7th September, 2024].
8. Grulich, A. E., van Leeuwen, M. T., Falster, M. O., & Vajdic, C. M. (2007). Incidence of cancers in people with HIV/AIDS compared with immuno suppressed transplant recipients: A meta-analysis. *Lancet (London, England)*, *370*(9581), 59–67. https://doi.org/ 10.1016/S0140-6736(07)61050-2
9. Guideline on secondary prevention of cervical cancer for public sector health facilities (2018) Department of Public Health, Maternal and Reproductive Health Division, MOHS. Myanmar editor.
10. HIV and AIDS Data Hub for Asia Pacific Region.(2023) Key facts on HIV, Myanmar https://www.aidsdatahub.org/country-profile s/myanmar.
11. Mayaud P, Weiss HA, Lacey CJ, Gill DK, Mabey DC. Genital human papillomavirus genotypes in northwestern Tanzania. J Clin Microbiol. (2003) 41:4451–3. doi: 10.1128/ JCM.41.9.4451-4453.2003
12. Seyoum A, Assefa N, Gure T, Seyoum B, Mulu A and Mihret A (2022) Prevalence and Genotype Distribution of High-Risk Human Papillomavirus Infection Among Sub-Saharan African Women: A Systematic Review and Meta-Analysis. Front. Public Health 10: 890880. doi: 10.3389/fpubh.2022.890 880.
13. Soto-Salgado, M., Ramos-Sepúlveda, M., Ramos-Cartagena, J. M., Tirado-Gómez, M.,

Guiot, H. M., Muñoz-Massó, C., González-Sepúlveda, L., & Ortiz, A. P. (2025). Disparities in the uptake of HPV-related cancer prevention strategies among women by HIV status in Puerto Rico. *Gynecologic Oncology Reports*, *57*, Article 101687. https://doi. org/10.1016/j.gore.2025.101687.

14. Sun, X. W., Kuhn, L., Ellerbrock,T. V., et al. (1997). Human papillomavirus infection in women infected with the human immunodeficiency virus. *New England Journal of Medicine 337,*(19), 1343-1349. https://doi.org/10.1056/NEJM199711063371903.
15. Thorsteinsson K, Storgaard M, Katzenstein TL, Ladelund S, Rønsholt FF, Johansen IS, Pedersen G, Hashemi L, Nielsen LN, Nilas L, Obel N, Bonde J, Lebech AM. (2016) Prevalence and distribution of cervical high-risk human papillomavirus and cytological abnormalities in women living with HIV in Denmark - the SHADE. BMC Cancer. Nov 8;16(1):866. doi: 10.1186/s12885-016-2881-1. PMID: 27821088; PMCID: PMC5100104.
16. Win TZK, Simms K, Thinn MM, Tin KN, Aung S, Feletto E, Bateson D, Canfell K. A Review of Human Papillomavirus Prevalence and Cervical Cancer in Myanmar. J Epidemiol Glob Health. 2025 Jun 25; 15(1):89. doi: 10.1007/s44197-025- 00436-4. PMID: 40560256; PMCID: PMC12198 088.
17. Womack, S., Chirenje, Z. M., Gaffikin, L., et al. (2000). HPV-based cervical cancer screening in a population at high risk for HIV infection. *International Journal of Cancer*, 85(2), 206-210.
18. World Health Organization. (2021). WHO guideline for screening and treatment of cervical pre cancer lesions for cervical cancer prevention, 2nd ed.
19. YCWH statistics (2017,2018,2019). Hospital Statistics (2017-2019), Yangon Central Women's Hospital, Yangon.