

Original Article

Determinant of recovery, recurrence and recurrence-free interval of condyloma acuminata: A five-year cross-sectional data from a provincial referral hospital in Indonesia

Prasetyadi Mawardi^{1*}, Muhammad I. Maulana¹, Endra Y. Ellistasari¹, Pratiwi P. Primisawitri¹ and Rina Purnamasari¹

¹Department of Dermatology and Venereology, Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Indonesia

*Corresponding author: prasetyadi_m@staff.uns.ac.id

Abstract

Condyloma acuminata is a common sexually transmitted disease caused by human papillomavirus infection and is characterized by frequent recurrence despite available therapies. This study evaluated recovery, recurrence, and recurrence-free interval across therapeutic modalities among condyloma acuminata outpatients at Dr. Moewardi Regional General Hospital, Surakarta, Indonesia, from January 2020 to December 2024. Using a cross-sectional analysis of medical records, 132 eligible patients were included and analyzed with bivariate tests. Treatment modality was not significantly associated with recovery ($p=0.157$), although recovery was highest with trichloroacetic acid (71.2%), followed by excision (66.7%), combination therapy (trichloroacetic acid + cryotherapy) (64.7%), and cryotherapy alone (33.3%). In bivariate analysis, type of therapy ($p=0.025$) as well as type of condyloma ($p<0.001$), sexual orientation ($p=0.019$), and HIV status were associated with recurrence, with the highest recurrence observed after excision (42.4%) and the lowest after cryotherapy alone (11.1%). Mean recurrence-free interval varied across modalities (cryotherapy 8.00 ± 0.00 ; trichloroacetic acid (TCA) 15.92 ± 28.49 ; excision 18.93 ± 13.64 ; combination therapy 27.50 ± 36.67 weeks), with the longest interval observed in the combination group. However, statistical analysis revealed that only types of condyloma, sexual orientation, and HIV status were associated with the mean recurrence time. Overall, recovery and recurrence patterns differed descriptively across treatment modalities, with excision showing the highest recurrence and cryotherapy alone the lowest. Recurrence outcomes varied according to treatment modality; however, no significant association was observed between therapy type and recurrence-free interval.

Keywords: Sexually transmitted infection, condyloma acuminata, therapy, recurrence, cryotherapy

Introduction

Condyloma acuminata (CA) is a common sexually transmitted disease (STD) characterized by flesh-like and skin-colored papules in the genital and anorectal regions, usually caused by infection of several strains of human papillomavirus (HPV), especially types 6 and 11 [1,2]. Genital HPV infection, as the main cause of CA, has a highly variable prevalence ranging from 1.5% to 44.3% in females and 3.5% to 46.4% in males, depending on age, population, and detection methods [3]. Clinically, CA is commonly referred to as genital warts, anal warts, or anogenital warts [1]. The World Health Organization (WHO) estimates that about 1% of sexually active



adults have clinical CA, with the highest prevalence among individuals aged 20 to 29 years [2]. The Indonesian Ministry of Health reported that the prevalence of CA was around 0.5% in 2020 in the country [2]. A study at Dr. Moewardi Regional General Hospital in 2023 identified 192 cases of CA during 2016–2020 [4].

HPV infection is mainly transmitted through skin-to-skin sexual contact and HPV-infected epithelial cells are released into the traumatized tissues. The virus subsequently evades host immune surveillance and infects basal keratinocytes within the stratified epithelium. As these infected basal cells undergo differentiation and migrate toward the epithelial surface, viral replication and assembly occur, ultimately leading to the formation of clinically apparent lesions, including genital warts. The incubation period of the virus can occur within a few weeks to several years, usually occurring about 3 months after exposure to the virus [5]. The clinical manifestations of CA typically present as exophytic cauliflower that appears as genital warts. Genital warts can be diagnosed by physical examination and confirmed by histopathological examination [6]. CA can grow on the external genitalia, perineum, perianal and surrounding areas, and lesions can extend to the vagina, urethra, and anal canal [7].

There is currently no definitive antiviral therapy capable of eradicating HPV infection in patients with genital warts. However, complete lesion removal may be achieved, particularly when the lesions are detected at an early stage and remain small in size [6]. The primary objective of CA treatment is the elimination of visible warts, as these lesions may lead to cosmetic concerns and significant psychosocial distress. Therapeutic selection should be individualized, taking into account lesion size and number, anatomical location, cost considerations, patient comfort and preference, potential adverse effects, and the clinician's expertise and experience [5]. Various therapy options are available, such as topical, immunotherapy, photodynamics, and surgery, or a combination of therapies [7].

Recurrence is defined as the reappearance of lesions or the detection of HPV DNA following a documented period of clinical clearance or after therapeutic intervention, and it remains a significant clinical challenge in the management of CA. Beyond its physical manifestations, recurrent CA may adversely affect patients' mental well-being, contributing to stress, panic, anxiety, depression, and other psychological disturbances. A study conducted in Bosnia reported an overall recurrence rate of 10–25%, with variation according to treatment modality: podophyllin 22–55%, trichloroacetic acid (TCA) 20%, cryotherapy 22–37%, electroresection approximately 60%, surgical excision approximately 11%, and interferon 40–89% [7]. However, data evaluating recurrence rates according to therapeutic modality in Indonesia remain limited. Most published studies have focused primarily on treatment efficacy or clinical clearance without a comprehensive assessment of recurrence patterns and recurrence-free intervals in real-world clinical settings. Considering differences in patient characteristics, HIV prevalence, sexual behavior, and treatment practices, local evidence is necessary to better understand recurrence dynamics in Indonesian patients with CA. Therefore, this study was conducted to analyze differences in recurrence rates among patients with CA following various therapeutic interventions in Indonesia.

Methods

Study design and setting

An analytical observational study with a cross-sectional design was conducted to evaluate the association between therapeutic modalities and recurrence of CA. The study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies. The study was performed at the Dermatology and Venereology Polyclinic of Dr. Moewardi Regional General Hospital, Surakarta, Indonesia, a tertiary referral hospital. Data were collected retrospectively from electronic medical records of patients treated between January 2020 and December 2024.

Patients and criteria

The study population consisted of patients aged 18–71 years who were diagnosed with CA based on clinical examination and relevant supporting investigations. The study population comprised

patients aged 18–71 years who were diagnosed with CA based on clinical examination and relevant supporting investigations. Eligible participants met the following inclusion criteria: (1) a confirmed clinical diagnosis of CA; (2) receipt of therapeutic intervention TCA, cryotherapy, combination therapy, or excision); and (3) complete medical records, including treatment outcomes and follow-up data sufficient to ascertain recurrence status. Patients were excluded if they: (1) were lost to follow-up before recurrence assessment; (2) had received prior treatment for CA at another healthcare facility; or (3) had suspected malignant transformation or other concomitant anogenital tumors.

Sample size and sampling method

This study used total sampling. All patients diagnosed with CA who met the inclusion criteria during the study period were included. No formal sample size calculation was performed because the study was retrospective and relied on a fixed population within a predefined time frame. After applying the inclusion and exclusion criteria, 132 patients were included in the final analysis.

Study variables

Three outcomes were assessed: recovery status, recurrence and recurrence-free interval. Recovery status was defined as complete clinical clearance of visible lesions after therapy, as documented by the attending physician, and classified as recovered or non-recovered. Recurrence was defined as the reappearance of clinically visible lesions at the same or adjacent anatomical site after documented recovery and was classified as yes or no based on follow-up records. The recurrence-free interval (mean recurrence time) was defined as the duration (weeks) from documented recovery to the first recorded recurrence and was analyzed as a continuous variable (mean±standard deviation).

The primary independent variable was therapeutic modality, categorized as TCA, cryotherapy, combination therapy (TCA + cryotherapy), and surgical excision, as recorded in the medical charts. Covariates included sex (male/female), age group, anatomical site of predilection (penis, vulvovaginal, perianal, or combined), type of condyloma (giant vs non-giant), sexual orientation (heterosexual, homosexual, bisexual), and HIV status (reactive/non-reactive). All variables were extracted from clinical and laboratory records in the hospital database.

Data collection and data management

Data were collected retrospectively from electronic medical records at the Dermatology and Venereology outpatient clinic of Dr. Moewardi Regional General Hospital. Relevant variables were extracted using a structured data extraction form. Data extraction was performed by trained investigators under the supervision of the research team to maximize accuracy and completeness. Records with missing key variables related to treatment or recurrence outcomes were excluded based on predefined criteria. All data were anonymized prior to analysis by removing personal identifiers and assigning unique study codes. The dataset was stored in a secure database accessible only to the research team. Data cleaning, coding, and verification were completed before statistical analysis to ensure consistency and data integrity.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics version 25 (IBM, New York, USA). Data normality was assessed using the Kolmogorov–Smirnov test. Analysis was conducted using the Chi-squared test and the Mann-Whitney test. Statistical significance was defined as a *p*-value of less than 0.05.

Results

Characteristics of the study subjects

During the study period, 168 CA patients were diagnosed, and 36 patients were excluded due to incomplete medical records (*n*=20), loss to follow-up before recurrence evaluation (*n*=10), and prior treatment at other healthcare facilities (*n*=6). A total of 132 patients with CA were included in this study, and their baseline characteristics are summarized in **Table 1**. Male patients comprised 68.2% of the cohort, and the majority of patients were aged 21–30 years (48.5%). The

most common anatomical site of involvement was the perianal region (46.2%), followed by the vulvovaginal area (30.3%) and the penis (18.9%). The most common type of CA was non-giant condyloma (75.8%), while the most commonly administered type of therapy was TCA (55.3%). The majority of the patients were identified as heterosexual (50.8%), while 36.4% were homosexual. The overall recovery rate reached 66.7% while the recurrence incidence was 23.5% (**Table 1**).

Table 1. Characteristics of the patients with condyloma acuminata included in the study (n=132)

Variable	Frequency	Percentage
Gender		
Female	42	31.8
Male	90	68.2
Age		
≤20 years	8	6.1
21–30 years	64	48.5
31–40 years	32	24.2
41–50 years	17	12.9
51–60 years	8	6.1
61–70 years	2	1.5
>70 years	1	0.8
Predilection		
Penis	25	18.9
Vulvovaginal	40	30.3
Perianal	61	46.2
Penis and perianal	6	4.5
Type of condyloma		
Giant condyloma	32	24.2
Non-giant condyloma	100	75.8
Types of therapy		
Trichloroacetic acid (TCA)	73	55.3
Cryotherapy	9	6.8
TCA + cryotherapy	17	12.9
Excision	33	25.0
Orientation		
Bisexual	17	12.9
Homosexual	48	36.4
Heterosexual	67	50.8
HIV		
Reactive	61	46.2
Non-reactive	71	53.8
Recovery status		
Non-recovered	44	33.3
Recovered	88	66.7
Recurrence		
Yes	31	23.5
No	101	76.5

Factors associated with recovery

Type of condyloma was the only variable significantly associated with recovery ($p=0.022$), with a higher proportion of recovery observed among patients with non-giant condyloma (72.0%) (**Table 2**). In contrast, no significant associations were identified between recovery and gender ($p=0.428$), age ($p=0.786$), anatomical site of predilection ($p=0.223$), type of therapy ($p=0.157$), sexual orientation ($p=0.215$), or HIV status ($p=0.805$) (**Table 2**).

Table 2. Factors associated with recovery among condyloma acuminata patients

Variable	Recovered		Non-recovered		p-value
	Frequency	Percentage	Frequency	Percentage	
Gender ^a					0.428
Female	30	71.4	12	28.6	
Male	58	64.4	32	35.6	
Age ^b					0.786
≤20 years	5	62.5	3	37.5	
21–30 years	42	65.6	22	34.4	
31–40 years	23	71.9	9	28.1	
41–50 years	10	58.8	7	41.2	

Variable	Recovered		Non-recovered		p-value
	Frequency	Percentage	Frequency	Percentage	
51–60 years	6	75.0	2	25.0	0.223
61–70 years	1	50.0	1	50.0	
>70 years	1	100.0	0	0.0	
Predilection ^a					0.223
Penis	19	76.0	6	24.0	
Vulvovaginal	28	70.0	12	30.0	
Perianal	39	63.9	22	36.1	
Penis and perianal	2	33.3	4	66.7	
Types of condyloma ^a					0.022*
Giant condyloma	16	50.0	16	50.0	
Non-giant condyloma	72	72.0	28	28.0	
Types of therapy ^a					0.157
Trichloroacetic acid (TCA)	52	71.2	21	28.8	
Cryotherapy	3	33.3	6	66.7	
TCA + cryotherapy	11	64.7	6	35.3	
Excision	22	66.7	11	33.3	
Orientation ^a					0.215
Bisexual	9	52.9	8	47.1	
Homosexual	30	62.5	18	37.5	
Heterosexual	49	73.1	18	26.9	
HIV ^a					0.805
Reactive	40	65.6	21	34.4	
Non-reactive	48	67.6	23	32.4	

^aAnalyzed using the Chi-squared test

^bAnalyzed using the Mann-Whitney test

*Statistically significant at $p < 0.05$

Factors associated with recurrence

Several variables were significantly associated with CA recurrence, including type of condyloma ($p < 0.001$), type of therapy ($p = 0.025$), sexual orientation ($p = 0.019$), and HIV status ($p = 0.019$) (**Table 3**). In contrast, gender ($p = 0.089$), age ($p = 0.495$), and anatomical site of predilection ($p = 0.053$) were not significantly associated with recurrence incidence (**Table 3**).

Table 3. Factors associated with recurrence of the disease among condyloma acuminata patients

Variable	Recurrence		Non-recurrence		p-value
	Frequency	Percentage	Frequency	Percentage	
Gender ^a					0.089
Female	6	14.3	36	85.7	
Male	25	27.8	65	72.2	
Age ^b					0.495
≤20 years	4	50.0	4	50.0	
21–30 years	13	20.3	51	79.7	
31–40 years	8	25.0	24	75.0	
41–50 years	5	29.4	12	70.6	
51–60 years	1	12.5	7	87.5	
61–70 years	0	0.0	2	100.0	
>70 years	0	0.0	1	100.0	
Predilection (location) ^a					0.053
Penis	4	16.0	21	84.0	
Vulvovaginal	5	12.5	35	87.5	
Perianal	21	34.4	40	65.6	
Penis and perianal	1	16.7	5	83.3	
Types of condyloma ^a					<0.001*
Giant condyloma	15	46.9	17	53.1	
Non-giant condyloma	16	16.0	84	84.0	
Types of therapy ^a					0.025*
Trichloroacetic acid (TCA)	12	16.4	61	83.6	
Cryotherapy	1	11.1	8	88.9	
TCA + cryotherapy	4	23.5	13	76.5	
Excision	14	42.4	19	57.6	
Orientation ^a					0.019*
Bisexual	5	29.4	12	70.6	
Homosexual	17	35.4	31	64.6	
Heterosexual	9	13.4	58	86.6	
HIV ^a					0.019*

Variable	Recurrence		Non-recurrence		p-value
	Frequency	Percentage	Frequency	Percentage	
Reactive	20	32.8	41	67.2	
Non-reactive	11	15.5	60	84.5	

^a Analyzed using the Chi-squared test

^b Analyzed using the Mann-Whitney test

*Statistically significant at $p < 0.05$

Factors associated with the mean recurrence time

Analysis of factors associated with the mean recurrence time is presented in **Table 4**. The mean recurrence time differed significantly by type of condyloma ($p=0.001$), with recurrence observed in 46.9% giant condyloma and 16.0% patients with non-giant condyloma; the corresponding mean recurrence times were 17.27 ± 13.04 weeks and 19.69 ± 29.97 weeks, respectively. Mean recurrence time did not differ significantly across therapeutic modalities ($p=0.056$). By sexual orientation, mean recurrence time differed significantly ($p=0.012$), being lowest in bisexual patients (10.20 ± 10.83 weeks; $n=5$) and highest in heterosexual patients (28.56 ± 36.76 weeks; $n=9$). HIV status was also associated with recurrence time ($p=0.034$), with mean recurrence times of 18.25 ± 20.43 weeks in reactive patients ($n=20$) and 19.00 ± 28.22 weeks in non-reactive patients ($n=11$) (**Table 4**).

Table 4. Factors associated with the mean recurrence time among condyloma acuminata patients

Variable	Recurrence		Mean of recurrence time (weeks)		p-value ^a
	n	Percentage	Mean	SD	
Types of condyloma					0.001*
Giant condyloma	15	46.9	17.27	± 13.04	
Non-giant condyloma	16	16.0	19.69	± 29.97	
Types of therapy					0.056
Trichloroacetic acid (TCA)	12	16.4	15.92	± 28.49	
Cryotherapy	1	11.1	8.00	± 0.00	
TCA + cryotherapy	4	23.5	27.50	± 36.67	
Excision	14	42.4	18.93	± 13.64	
Orientation					0.012*
Bisexual	5	29.4	10.20	± 10.83	
Homosexual	17	35.4	15.65	± 14.19	
Heterosexual	9	13.4	28.56	± 36.76	
HIV					0.034*
Reactive	20	32.8	18.25	± 20.43	
Non-reactive	11	15.5	19.00	± 28.22	

^a Analyzed using the Chi-squared test

*Statistically significant at $p < 0.05$

Discussion

In this study, most patients with CA were male (68.2%) and adults (95.5%), consistent with epidemiological patterns reported in Indonesia and globally. A study in Germany in 2020 reported a similarly male-predominant distribution (83.9%) [8], and a study in Surakarta, Indonesia (2022) also found a higher proportion of cases in men than women (55% vs 45%) [9]. This male predominance may reflect greater clinical detectability of external genital lesions in men, leading to earlier healthcare seeking, whereas lesions in women may be internal and less readily recognized [10]. Nearly half of the patients in this study were aged 21–30 years (48.5%), aligning with the period of peak sexual activity and increased risk of HPV exposure. This pattern is consistent with a study in Surakarta, Indonesia (2022) that reported the highest proportion of CA cases in the 21–30-year age group [9]. Similarly, another study found that most cases occurred among adults aged 19–59 years (94.7%), with a lower incidence in adolescents and older adults [10]. Overall, these findings likely reflect underlying epidemiological patterns and healthcare-seeking behaviors among sexually active young adults [11].

In this study, the perianal region was the most frequent predilection site (46.2%), followed by vulvovaginal (30.3%) and penile (18.9%) locations. This distribution is consistent with a Surakarta study (2021), which reported anorectal involvement more frequently than genital or combined genital-anorectal lesions [10]. The predominance of perianal lesions may relate to the anal transition zone above the linea dentata, where relatively immature epithelium is more

susceptible to microtrauma and HPV transmission [12]. Most participants identified as heterosexual (50.8%). Given that CA is transmitted through sexual contact, including genitogenital, orogenital, and anogenital routes, lesion distribution is influenced by sexual practices and local mucosal susceptibility; thinner mucosa is generally more vulnerable to viral inoculation than thicker, keratinized skin [13,14]. Additionally, 46.2% of patients were HIV-positive. This finding aligns with local data from Dr. Moewardi Regional General Hospital showing CA as the most common sexually transmitted infection among patients with HIV/AIDS [15] and with evidence from Yogyakarta indicating a higher prevalence of CA in HIV-positive populations than in HIV-negative individuals [16].

The results of this study showed that treatment modality was not significantly associated with recovery rate among patients with CA ($p=0.157$). However, there was a trend toward higher recovery with TCA (71.2%), followed by surgical excision (66.7%), combination therapy (TCA + cryotherapy) (64.7%), and cryotherapy alone (33.3%). These findings are consistent with a 2023 systematic review, which reported that chemical cauterization with TCA had the highest recovery rate in anogenital CA, reaching 94.1% [17]. A randomized controlled trial in Jakarta, Indonesia (2020) comparing 5-fluorouracil cream with 90% TCA for genital warts also found a faster clinical response in the TCA group [18].

In contrast, treatment modality was significantly associated with recurrence ($p=0.025$). The highest recurrence rate occurred in the excision group (42.4%), followed by combination therapy (23.5%), TCA alone (16.4%), and cryotherapy alone (11.1%). The higher recurrence after excision may be related to procedural characteristics and the ability of HPV to persist in surrounding tissues [19]. Although excision removes clinically visible lesions, it may not completely eradicate HPV from adjacent epithelium or wound margins, allowing latent virus or microscopic lesions to reactivate. Postoperative factors may also contribute, including suboptimal wound hygiene and persistent moisture at the surgical site, which may facilitate reinfection and new lesion formation [20].

The relatively low recurrence rates observed after combination therapy with TCA and cryotherapy (23.5%) and after TCA alone (16.4%) may be attributed to the localized destructive effects of these modalities on infected epithelium. Trichloroacetic acid acts as a caustic agent that induces coagulative necrosis and protein denaturation, thereby destroying human papillomavirus-infected keratinocytes [17]. This finding is consistent with a 2023 systematic review, which reported that higher TCA concentrations (70–90%) achieved high clinical recovery rates (94.1%) [17]. Treatment success with TCA and cryotherapy is also influenced by operator technique, particularly application precision and adequate depth of tissue destruction, which helps eradicate infected cells while minimizing injury to adjacent healthy epithelium [21]. Overall, the low recurrence in these groups likely reflects both the biological effect of local tissue destruction and appropriate procedural execution in lesion management.

Analysis of mean recurrence time indicated variation by treatment modality. The shortest mean recurrence time was observed after cryotherapy, followed by TCA, excision, and combination TCA with cryotherapy. This pattern suggests that combination therapy may be associated with a longer recurrence-free interval than single-modality treatment. The prolonged interval is plausibly related to a synergistic effect, in which chemical destruction by TCA is complemented by tissue injury induced by cryotherapy, potentially improving lesion clearance [17]. A case report also described lesion-free outcomes after six sessions of combined 80% TCA and cryotherapy at 3-day intervals, although recurrence was not reported [16]. These findings suggest that combining destructive modalities may provide more comprehensive eradication of visible and subclinical lesions, thereby delaying regrowth and recurrence. However, this pattern should be interpreted cautiously because treatment selection, lesion severity, and follow-up duration may differ across groups and influence observed recurrence times.

This study has some limitations. The retrospective design relying on medical record data may be subject to incomplete documentation and information bias. This study was conducted at a single tertiary referral hospital, which may limit the generalizability of the findings to other healthcare settings or populations. Despite these limitations, this study provides valuable real-world evidence regarding therapeutic modality-dependent recurrence patterns of CA in an Indonesian clinical setting.

Conclusion

In this five-year analysis of patients with CA at a tertiary referral hospital, recurrence was common and varied across treatment modalities. Excision showed the highest recurrence proportion, whereas cryotherapy alone showed the lowest; however, after adjustment, only giant condyloma independently predicted recurrence, highlighting lesion size/type as a key determinant of relapse risk. Combination therapy (TCA plus cryotherapy) was associated with the longest recurrence-free interval, suggesting potential clinical benefit for prolonging remission even though between-modality differences in recurrence-free time were not statistically significant. These findings support risk-stratified management—particularly closer follow-up and consideration of more intensive or combined approaches for giant lesions—and highlight the need for prospective studies with standardized follow-up to confirm optimal strategies for reducing recurrence in routine practice.

Ethics approval

This study was conducted in accordance with the Declaration of Helsinki and received ethical approval from the Ethics Committee of the Faculty of Medicine, Universitas Sebelas Maret, Surakarta (No: 1298/VI/HREC/2025). As this study utilized secondary data obtained from electronic medical records, informed consent from individual patients was waived, and all data were anonymized to ensure confidentiality.

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Competing interests

All the authors declare that there are no conflicts of interest.

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Underlying data

Derived data supporting the findings of this study are available from the corresponding author on reasonable request.

Declaration of artificial intelligence use

We hereby confirm that no artificial intelligence (AI) tools or methodologies were utilized at any stage of this study, including during data collection, analysis, visualization, or manuscript preparation. All work presented in this study was conducted manually by the authors without the assistance of AI-based tools or systems.

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References

1. Dițescu D, Istrate-Ofițeru AM, Roșu GC, *et al.* Clinical and pathological aspects of condyloma acuminatum: Review of literature and case presentation. *Rom J Morphol Embryol* 2021;62(2):369-383.
2. Luvera L, Masita R. Condyloma acuminata in female young adult: A case report. *J Ilm Ilmu Pendidik* 2025;8(3):3154-3159.

3. Holmes KK, Sparling PF, Stamm WE, Piot P, Wasserheit JN, Corey L. Sexually transmitted diseases. 4th ed. New York: McGraw-Hill Medical; 2011.
4. Negara A, Murastami A. Profil pasien infeksi menular seksual di poliklinik kulit dan kelamin rsud dr. Moewardi surakarta periode januari 2016–desember 2020. *Medicinus* 2025;3(6):13-24.
5. Setyowatie L, Atif M. Terapi kombinasi pada pasangan suami istri dengan kondilomata akuminata. *J Dermatol Venereol Aesthet* 2021;2(2):1-12.
6. Singh MP, Rungta T, Saikia UN. Role of human papillomavirus 6 and 11 in condylomata acuminata in Indian patients. *Indian J Pathol Microbiol* 2021;64(3):532-534.
7. Zhan M, Tong Z, Chen S, *et al.* Establishing a prediction model for recurrence of condyloma acuminatum. *Eur J Med Res* 2022;27(1):183.
8. Engelshofen BM, Marsela E, Engelsberger N, *et al.* Condylomata acuminata: A retrospective analysis on clinical characteristics and treatment options. *Heliyon* 2020;6(3):e03547.
9. Mawardi P, Febrianto B, Yuliarto D. Comparison of the effectiveness of chemosurgery and cryosurgery for the treatment of patients with condyloma acuminatum. *Indones J Med* 2021;6(3):291-297.
10. Mawardi P, Febrianto B, Yuliarto D, Sumandjar T. Comparing the efficacy of chemical cautery to cryosurgery on CD4+ status of HIV patients with condyloma acuminata. *Clin Cosmet Investig Dermatol* 2021;14:1453-1458.
11. Yasa M, Sriyani G. Characteristics of condyloma acuminata in the Dermatology and Venereology Polyclinic of Bali Mandara Hospital in 2019–2022. *Int J Healthc Sci* 2024;11(2):163-165.
12. El-Haddad J. Revisiting the anatomy of the rectum and the anal canal. In: *Diseases of the rectum and anus: A concise guide*. United States: IntechOpen; 2025.
13. Tandyono V, Wiraguna A. Kondiloma akuminata anogenital pada seorang pasien HIV stadium III yang diterapi dengan kombinasi asam trikloroasetat topikal dan seng (Zn) oral. *Medicina* 2021;52(2):111-117.
14. Rohanda BA, Hutapea R, Nadeak K. Identification of the type of human papillomavirus (HPV) in condyloma acuminata in the genital and/or anal areas in men who have sex with men (MSM). *Bali Med J* 2021;10(2):885-890.
15. Soenardi A, Mawardi P. Hubungan antara kadar CD4+ dengan angka kejadian infeksi menular seksual pada pasien HIV/AIDS. *Berk Ilm Kesehat Kulit Kelamin* 2019;31(2):104-110.
16. Dhamayanti ME, Rahayu T, Wirawan EP, *et al.* Terapi kondiloma akuminata dengan kombinasi trichloroacetic acid (TCA) 80% + krioterapi. *Cermin Dunia Kedokt* 2020;46(6):443-447.
17. Mawardi P, Kamilah L, Fauziyyah Heryadi F, Arrosyid A. The effectiveness of chemical cautery and electrosurgery on anogenital wart: A systematic review. *Clin Cosmet Investig Dermatol* 2023;16:2773-2780.
18. Anggraini I, Hoemardani AS, Nilasari H, Indriatmi W. Randomised controlled trial of 1% and 5% 5-fluorouracil creams compared with 90% trichloroacetic acid solution for anogenital wart treatment. *Int J STD AIDS* 2020;31(9):849-858.
19. Mihailov R, Tatu AL, Niculet E, *et al.* Surgical management of perianal giant condyloma acuminatum of Buschke and Löwenstein: case presentation. *Life* 2023;13(9):1916.
20. Epipode N, Bashir Z, Liang Y. Condyloma acuminatum recurrence can be reduced by lesional autotransplantation. *Res Sq* 2024;2(13):1-13.
21. Das S. Human papillomavirus infection: management and treatment. In: *Human Papillomavirus*. United States: IntechOpen; 2020.