MUKHTABAR
JOURNAL OF MEDICAL LABORATORY TECHNOLOGY

VOLUME 3 (2), 2025, 73-81 | RESEARCH ARTICLE
e-ISSN: 2987-0224

Identification of *Candida albicans* Fungi in the Urine of Pre-Menstrual Girls Aged 10-14 Years at SMPN 1 Ciamis

Undang Ruhimat [1], Nailah Ghaissani Dwi Gustari [1], Firda Yanuar Pradani [2]

[1] Medical Laboratory Technology Study Program, STIKes Muhammadiyah Ciamis, West Java, Indonesia
[2] Pangandaran Public Health Laboratory, West Java, Indonesia

*Corresponding author: nailahghaissani02@gmail.com

ABSTRACT

Background & Objectives: *Candida albicans* is an opportunistic commensal fungus that becomes pathogenic when there is an immune disorder or physiological change. The resulting infection, called candidiasis, is acute or subacute and can affect various organs. Poor personal hygiene is a predisposing factor, especially in genital infections. This study aims to determine the presence and prevalence of *Candida albicans* in the urine of premenstrual girls aged 10-14 years at SMPN 1 Ciamis.
Method: This study used a descriptive cross-sectional design. Sampling was performed using purposive sampling, with a total of 23 samples collected. The samples were examined at the Parasitology Laboratory of STIKes Muhammadiyah Ciamis.
Results: The results of the study of 23 samples found 3 samples (13%) positive for *Candida albicans*, 2 samples (9%) positive for *Candida tropicalis*, and 18 samples (78%) showed no fungal growth.
Conclusion Based on the results of this study, poor personal hygiene can influence *Candida albicans* fungal infection, especially in premenstrual adolescent girls aged 10-14 years.

Keywords: *Candida albicans*, Adolescent Girls, Vulvovaginal Candidiasis, Personal Hygiene.

https://doi.org/10.52221/mjmlt.v3i2.931 Published online by LPPM STIKes Muhammadiyah Ciamis

INTRODUCTION

Candida albicans is a commensal and opportunistic pathogen in humans, whose balance is maintained by the activity of the innate immune system and its resident microbiota (Bojang et al., 2021). *Candida albicans* becomes a pathogen when there are physiological changes or a decrease in immunity, which can cause an infection called candidiasis. Candidiasis is an acute or subacute fungal disease that can affect the mouth, vagina, skin, nails, bronchi, and lungs, and can affect humans of all ages (Gunawan et al., 2018).

Vulvovaginal candidiasis (VVC) is a symptom of vaginitis and affects the vulva

(erythema and inflammation) caused by *Candida sp*. infection. VVC is most commonly caused by the *Candida albicans* species (80–90%). Non-Candida albicans species that can also cause VVC include *Candida parapsilosis*, *Candida tropicalis*, *Candida krusei*, and *Candida glabrata* (Asnaily et al., 2023). VVC was recorded in 64.2% and 35.7% of children and adolescents, with 27% caused by Candida (Manuputty & Astari, 2020).

Poor personal hygiene can facilitate the transmission of diseases, especially in the reproductive organs, caused by the fungus *Candida albicans*. In addition, the use of contaminated water in daily activities such as bathing, cleaning, and other needs can also affect the growth of *Candida albicans* fungi (Utami et al., 2024). Cleaning the vagina with chemicals can damage the normal vaginal flora balance and increase the risk of infection (Kartika Adyani et al., 2022).

Adolescents will experience sexual maturity, known as puberty, during which they will face new changes in their lives. Puberty, also known as the negative phase, is often more prominent in adolescent girls than in adolescent boys (Lutfiya, 2017). Physical maturation during puberty in adolescent girls begins with breast development, first menstruation, and changes in secondary sexual characteristics (Kisaran, 2024).

A lack of preparation in the early stages of menstruation will have an impact on poor vaginal hygiene behavior in adolescent girls. Sulistyoningsih (2014) reported that as many as 50.3% of adolescent girls who were not ready for their first menstruation had poor vaginal hygiene behavior. In addition, the readiness of adolescent girls is influenced by parental habits in raising children, level of knowledge, and the amount of information sources (Lutfiya, 2017). The absence of accurate and appropriate information about reproductive health forces adolescents to seek access and conduct their own searches. This can cause adolescents to seek information that may not be accurate, leading to poor reproductive health (Rofi'ah et al., 2017).

According to World Health Organization (WHO) data, adolescents aged 10-14 years (35-42%) have the highest incidence of reproductive tract infections (RTIs) worldwide. The most common diseases are candidiasis (25-50%), bacterial vaginosis (20-40%), and trichomoniasis (5-15%) (Aisyah et al., 2023). Statistical data in Indonesia also shows that 43.3 million adolescent girls aged 10 to 14 have very poor hygiene habits (Ghofur et al., 2023).

A common reproductive health problem among adolescent girls is vaginal discharge (Asri et al., 2023). About 90% of Indonesian women are at risk of vaginal discharge because Indonesia has a tropical climate. Countries with tropical climates can cause fungi to multiply and cause many cases of vaginal discharge in women. The incidence of vaginal discharge in Indonesia continues to increase every year, reaching 70% (Eduwan, 2022). Vaginal discharge, which is common among

adolescent girls, is often taken lightly by everyone. In fact, recurrent vaginal discharge can be a symptom of other sexually transmitted diseases such as trichomoniasis, bacterial vaginosis, vulvovaginal candidiasis, and other cervical polyps. It can even increase the risk of cervical cancer in adulthood due to vaginal discharge (Dewi & Putri, 2024). For adolescent girls who have just entered puberty (10-14 years old) and are experiencing all kinds of changes, this problem can have a negative impact if not addressed early on (Dara Anggun Prasasti et al., 2024).

Identifying *Candida albicans*, especially in premenstrual adolescent girls aged 10-14 years, is important as early prevention against the risk of further infection when they start menstruating and enter late adolescence. This is not only beneficial in mapping the health conditions of adolescents but also in providing health education for female students regarding the importance of maintaining bodily hygiene. Therefore, this research is particularly important for adolescent girls.

OBJECTIVE

To determine the presence and prevalence of *Candida albicans* fungus in the urine of premenstrual girls aged 10-14 years at SMPN 1 Ciamis.

METHOD

This study employed a descriptive cross-sectional design to identify the prevalence of *Candida albicans* in the urine of premenarchal adolescent girls aged 10–14 years. The study population consisted of 166 female students at SMPN 1 Ciamis. A total of 23 participants were selected using purposive sampling based on predefined criteria. The inclusion criteria were premenarchal adolescent girls aged 10–14 years who were willing to participate in the study, while the exclusion criteria included those who were not permitted to participate.

Data collection involved administering questionnaires and conducting laboratory examinations. Primary data were obtained through macroscopic and microscopic examination of urine samples to identify the presence of *Candida albicans*. Laboratory analysis was performed individually for each sample, and the results were analyzed descriptively. The study was conducted at SMPN 1 Ciamis from April to May 2025, using standard laboratory equipment including autoclaves, incubators, microscopes, centrifuges, and other supporting microbiological instruments.

RESULTS

The examination was conducted in stages, starting with direct examination of urine sediment, macroscopic observation on PDA media, microscopic examination using Lactophenol Cotton Blue staining, and species identification through carbohydrate fermentation testing on sugar media.

1. Observation of Fungal Spores in Urine

TABLE 1. Results of Observation of Fungal Spores in Urine

Sample Code	Examination Result
1	No spores detected
2	No spores detected
3	Spores detected
4	No spores detected

Sample Code	Examination Result
5	No spores detected
6	Spores detected
7	No spores detected
8	Spores detected
9	Spores detected
10	No spores detected
11	No spores detected
12	No spores detected
13	No spores detected
14	No spores detected
15	No spores detected
16	No spores detected
17	No spores detected
18	No spores detected
19	No spores detected
20	No spores detected
21	No spores detected
22	No spores detected
23	No spores detected

2. Macroscopic Examination of PDA Media

TABLE 2. Results of Macroscopic Examination of PDA Media

Sample Code	Observed Colony Characteristics
1	No growth observed
2	No growth observed
3	Round colonies with convex surface, smooth texture, and white coloration
4	No growth observed
5	No growth observed
6	Round colonies with convex surface, smooth texture, and yellowish-white coloration
7	No growth observed
8	Round colonies with convex surface, smooth texture, and yellowish-white coloration
9	Round colonies with convex surface, smooth texture, and yellowish-white coloration
10	Round colonies with convex surface, smooth texture, and white coloration
11	No growth observed
12	No growth observed
13	No growth observed
14	No growth observed
15	No growth observed

Sample Code	Observed Colony Characteristics
16	No growth observed
17	No growth observed
18	No growth observed
19	No growth observed
20	No growth observed
21	No growth observed
22	No growth observed
23	No growth observed

3. Microscopic Examination Using LPCB Staining

TABLE 3. Microscopic Examination Results Using LPCB Staining

Sample Code	Microscopic Examination Findings	Result Interpretation
3	Blastospores present	*Candida* sp.
6	Blastospores and pseudohyphae present	*Candida* sp.
8	Blastospores present	*Candida* sp.
9	Blastospores and pseudohyphae present	*Candida* sp.
10	Blastospores and pseudohyphae present	*Candida* sp.

4. Biochemical Test on Sugar Media

TABLE 4. Biochemical Test Results (Sugar Media)

Sample Code	Fermentation of Sugars			
	Glucose (Glu)	Maltose (Mal)	Sucrose (Suk)	Lactose (Lak)
3	Positive (+)	Positive (+)	Negative (-)	Negative (-)
6	Positive (+)	Positive (+)	Positive (+)	Negative (-)
8	Positive (+)	Positive (+)	Negative (-)	Negative (-)
9	Negative (-)	Negative (-)	Negative (-)	Negative (-)
10	Positive (+)	Positive (+)	Positive (+)	Negative (-)

5. Colony Examination on CHROMagar

TABLE 5. Results of Colony Examination on CHROMagar

Sample Code	Colony Color	Result Interpretation
3	Light Green	*Candida albicans*
6	Blue	*Candida tropicalis*
8	Light Green	*Candida albicans*
9	Light Green	*Candida albicans*
10	Blue	*Candida tropicalis*

DISCUSSION

The results of this study indicate the presence of *Candida* species variation in a small number of respondents, which may describe the profile of opportunistic fungal flora in this population.

Based on the results of direct examination of urine sediment with samples that had been cultured on PDA media, there were differences in the results. This could be because spores are quite difficult to identify in direct examination of urine sediment. Visualizing yeast cells in preparations is very difficult due to their very small size and the difficulty in distinguishing them from other cells present in urine sediment (Cahayaningrum et al., 2024).

The results of biochemical tests using sugar media showed that samples with codes 3 and 8 were positive for glucose and maltose, but not for sucrose and lactose. This fermentation pattern is characteristic of *Candida dubliniensi*. Meanwhile, samples with codes 6 and 10 showed positive results for glucose, maltose, and sucrose, but not for lactose. This fermentation pattern is consistent with the characteristics of *Candida albicans*, the species most commonly responsible for candidiasis. This identification was reinforced by the results of previous microscopic examination, which showed the presence of blastospore structures and

The results of *Candida* species identification tests using CHROMagar media showed that 3 samples (codes 3, 8, and 9) produced light green colonies, which is a characteristic feature of *Candida albicans*. Meanwhile, the other 2 samples (codes 6 and 10) produced blue colonies, indicating the presence of *Candida tropicalis*. These results are consistent with Mehta & Wyawahare (2016), who stated that the colony morphology of *Candida species* on CHROMagar is as follows: *Candida albicans* is light green, *Candida tropicalis* is blue to metallic blue, *Candida glabrata* is cream to white, and *Candida krusei* is purple. In this study, CHROMagar highlights the importance of using differential media to support laboratory diagnosis. This medium works based on the specific enzymatic ability of each *Candida species* to hydrolyze chromogenic substrates, resulting in different colony colors, which are very useful in quickly and accurately distinguishing species in a relatively short time (Pravin Charles et al., 2015).

The differences in identification results between the sugar fermentation method and cultivation on CHROMagar highlight the potential limitations of the fermentation method's sensitivity in identifying *Candida* at the species level. This indicates that the carbohydrate fermentation method alone is insufficient to provide conclusive results, especially since some *Candida species* have overlapping fermentation patterns. In this context, CHROMagar serves as a more specific confirmation method, and its use is highly recommended as part of a multiparametric approach to fungal identification (Pravin Charles et al., 2015).

Premenstrual adolescent girls are a group undergoing hormonal and physiological changes that can affect the balance of the microbiota, making them susceptible to *Candida* colonization. Additionally, the identification of C. albicans reinforces the urgency of early reproductive health education interventions. Vulvovaginal candidiasis in adolescents is often unrecognized and unreported, even though it can cause discomfort, secondary infections, and psychological effects (Pappas et al., 2015). Recognition of normal flora and the potential for opportunistic infections is an important basis for developing school-based prevention strategies.

This study emphasizes the importance of a multiparametric approach involving macroscopic, microscopic, and biochemical methods in identifying fungi. Combining these methods improves diagnostic accuracy and reduces the risk of misidentification, which can impact clinical management.

Overall, the results of this study not only provide an initial overview of *Candida sp*. flora in adolescent girls in a school setting but also open up important avenues for health promotion interventions focused on genital hygiene, puberty education, and early monitoring of potential opportunistic pathogen colonization.

CONCLUSION

This study, which employed culture on Potato Dextrose Agar (PDA), Lactophenol Cotton Blue staining, carbohydrate fermentation tests, and CHROMagar culture, identified *Candida fungi* in the urine of pre-menarcheal adolescent girls, finding *Candida albicans* in 13% (3/23) of samples and *Candida tropicalis* in 9% (2/23) of samples, indicating a potential health risk that could lead to infection under conducive conditions such as poor hygiene or hormonal changes, thus highlighting the critical need for promoting personal and reproductive hygiene education among adolescent girls to prevent such opportunistic fungal infections.

ACKNOWLEDGEMENT

Thank you to the supervisor who provided guidance and input to the author, and to the teenage students who were willing to be respondents.

CONFLICT OF INTEREST

There is no conflict of interest in preparing this research and writing this article.

REFERENCES

1. Aisyah, S., Dwiastiti Irianto, I., Zuraida Muhsinin, S., Zulfa, E., Studi Keperawatan Fakultas Ilmu Kesehatan Universitas Nahdlatul Wathan Mataram, P., kunci, K., Putri, R., & Reproduksi, K. (2023). Perilaku Remaja Putri dalam Mempertahankan Kesehatan Reproduksi Saat Menstruasi. Jurnal Pendidikan Tambusai, 7(1), 3738–3743.
2. Asnaily, A., Busman, H., & Siregar, S. (2023). ANALISIS FAKTOR RESIKO DAN IDENTIFIKASI SPESIES Candida PADA KANDIDIASIS VULVOVAGINALIS (KVV) PASIEN TUBERKULOSIS PARU (TB PARU) DI KOTA JAMBI. Indonesian Journal for Health Sciences, 7(1), 14–21. https://doi.org/10.24269/ijhs.v7i1.5065
3. Asri, U. H., Harlita, T. D., & Azahra, S. (2023). Identifikasi Jamur Candida Albicans Pada Urine Mahasiswi Diploma III Teknologi Laboratorium Medis Pengguna Pantyliner. Jurnal Kesehatan Tambusai, 4(3), 3324–3332.
4. Bojang, E., Ghuman, H., Kumwenda, P., & Hall, R. A. (2021). Immune sensing of Candida albicans. Journal of Fungi, 7(2), 1– 16. https://doi.org/10.3390/jof7020119
5. Cahayaningrum, A., Tandi Manu, T., & Khusuma, A. (2024). Identifikasi Sel Ragi (Candida sp.) pada Sedimen Urine dengan Menggunakan Metode Preparat Basah dan Preparat Gram pada Penderita Diabetes Melitus. Journal of Indonesia Laboratory Technology of Student (JILTS), 3(1), 52–58.
6. Dara Anggun Prasasti, Mastina, Eka Afrika, & Siti Aisyah. (2024). Faktor yang Berhubungan dengan Kejadian Keputihan pada Remaja Putri di Sekolah Menengah Pertama. Lentera Perawat, 5(1), 110–115. https://doi.org/10.52235/lp.v5i1.271
7. Dewi, S. U., & Putri, D. A. (2024). Pelaksanaan pendidikan kesehatan mengenai bahya keputihan untuk meningkatkan pengetahuan dan sikap pada remaja putri: studi kasus. Jurnal Penelitian Multidisiplin Ilmu, 2(5), 2245–2254.
8. Eduwan, J. (2022). Gambaran Pengetahuan Tentang Keputihan Pada Remaja Putri. Jurnal Vokasi Keperawatan (JVK), 5(1), 71–77. https://doi.org/10.33369/jvk.v5i1.22449
9. Ghofur, F. M., Yunita, R. D., & Aningsih, S. (2023). Hubungan Tingkat Pengetahuan dan Perilaku Remaja dengan Personal Hygiene Saat Menstruasi. Jurnal Ilmiah Kesehatan Rustida, 10(1), 66–75. https://doi.org/10.55500/jikr.v10i1.181
10. Gunawan, A., Eriawati, E., & Zuraidah, Z. (2018). PENGARUH PEMBERIAN EKSTRAK DAUN SIRIH (Piper sp.) TERHADAP PERTUMBUHAN JAMUR Candida albicans. Prosiding Biotik, 2(1), 368–376. http://www.jurnal.ar- raniry.ac.id/index.php/PBiotik/article/vie w/2702
11. Kartika Adyani, Noveri Aisyaroh, & Anisa, N. (2022). Faktor-Faktor yang Mempengaruhi Perilaku Manajemen Kebersihan Menstruasi Remaja : Literature Review. Media Publikasi Promosi Kesehatan Indonesia (MPPKI), 5(10), 1192–1198. https://doi.org/10.56338/mppki.v5i10.25
12. Kisaran, S. (2024). Jannatul Makwa Health : Jurnal Ilmiah Kesehatan (Scientific Journal of Health, 2, 37–44. https://jurnal.jannatulmakwa.org/index.php/AHMISSN
13. Lutfiya, I. (2017). Analisis Kesiapan Siswi Sekolah Dasar dalam Menghadapi Menarche. Jurnal Biometrika Dan Kependudukan,5(2), 135. https://doi.org/10.20473/jbk.v5i2.2016.13 5-145
14. Manuputty, A. G., & Astari, L. (2020). Kandidiasis Vulvovaginalis Pada Anak Dengan Diabetes Melitus Tipe I. Molucca Medica, 12, 43–51. https://doi.org/10.30598/molmed.2020. v13.i2.43
15. Mehta, R., & Wyawahare, A. S. (2016). Evaluation of Hicrome Candida Differential Agar for Species Identification of Candida Isolates from Various Clinical Samples. International

Journal of Contemporary Medical Research ISSN (Online, 43(4), 2393–2915. www.ijcmr.com

16. Pappas, P. G., Kauffman, C. A., Andes, D. R., Clancy, C. J., Marr, K. A., Ostrosky- Zeichner, L., Reboli, A. C., Schuster, M. G., Vazquez, J. A., Walsh, T. J., Zaoutis, T. E., & Sobel, J. D. (2015). Clinical Practice Guideline for the Management of Candidiasis: 2016 Update by the Infectious Diseases Society of America. Clinical Infectious Diseases, 62(4), e1–e50. https://doi.org/10.1093/cid/civ933
17. Pravin Charles, M. V., Kali, A., & Joseph, N. M. (2015). Performance of chromogenic media for Candida in rapid presumptive identification of Candida species from clinical materials. Pharmacognosy Research, 7, S69–S73. https://doi.org/10.4103/0974- 8490.150528
18. Rofi'ah, S., Widatiningsih, S., & Vitaningrum, D. (2017). Kesehatan Metode Peer Group dan Sikap Personal Hygiene Saat Menstruasi. Jurnal Ilmiah Bidan, 2(2), 31–36.
19. Utami, L., Dani, H., Warsinah, W., Sulastina, N. A., & Kirana, Y. (2024). Hubungan Personal Hygiene Terhadap Keberadaan Jamur Candida Albicans Penyebab Gejala Keputihan Pada Urin Mahasiswi di Perguruan Tinggi XXXX Tahun 2024. Ranah Research : Journal of Multidisciplinary Research and Development, 6(4), 1002–1013. https://doi.org/10.38035/rrj.v6i4.955