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Prevalence and Associated Factors of Sexually Transmitted Infection among Female Sexual Assault Victims attending the Police General Hospital

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ABSTRACT

Objectives: To assess the prevalence of sexually transmitted infections (STIs) and identify factors associated with STIs among female sexual assault victims.

Materials and Methods: A retrospective analysis of medical records for sexual assault victims at the Police General Hospital was conducted over the period from January 2018 to December 2022.

Results: Among 1,006 female victims, 12.33% tested positive for at least one STI, with Chlamydia trachomatis (6.66%) and Neisseria gonorrhoeae (2.88%) being the most common. Notably, chlamydia positivity dramatically increased in 2022, while other infections, including syphilis, hepatitis B & C, human immunodeficiency virus have shown minor variations over the years. The 10–19 age group, the largest demographic, had the highest STI prevalence (14.54%). Multivariate analysis identified pyuria as a strong independent predictor of STIs (adjusted odds ratio 4.85, $p < 0.001$)

Conclusion: STIs are prevalent among younger female victims, with Chlamydia trachomatis being the most common. Pyuria were strongly associated with STI risk, with routine urinalysis serving as a valuable diagnostic clue.

Keywords: sexual assault victims, sexually transmitted infections, associated factors.

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ความชุกและปัจจัยเสี่ยงที่เกี่ยวข้องกับโรคติดต่อทางเพศสัมพันธ์ในหญิงผู้ถูกล่วงละเมิดทางเพศที่มารับบริการที่โรงพยาบาลตำรวจ

ปาริชาติ นามเพ็ง, สุธรรม สุธาพร

บทคัดย่อ

วัตถุประสงค์: *เพื่อศึกษาแนวโน้มความชุกของโรคติดต่อทางเพศสัมพันธ์และปัจจัยเสี่ยงที่เกี่ยวข้องกับโรคติดต่อทางเพศสัมพันธ์ในหญิงผู้ถูกล่วงละเมิดทางเพศที่เข้ารับบริการที่โรงพยาบาลตำรวจ*

วัสดุและวิธีการ: *การศึกษาย้อนหลังโดยเก็บข้อมูลจากเวชระเบียนหญิงผู้ถูกล่วงละเมิดทางเพศที่เข้ารับบริการที่โรงพยาบาลตำรวจ ระหว่างวันที่ 1 มกราคม พ.ศ. 2561 ถึงวันที่ 31 ธันวาคม 2565*

ผลการศึกษา: *หญิงผู้ถูกล่วงละเมิดทางเพศจำนวน 1,006 ราย พบว่าร้อยละ 12.33 มีการติดเชื้อโรคติดต่อทางเพศสัมพันธ์อย่างน้อยหนึ่งชนิด โดยโรคหนองในเทียม พบได้มากที่สุดที่ร้อยละ 6.66 รองลงมาคือโรคหนองใน ร้อยละ 2.88 ทั้งนี้ในปี พ.ศ. 2565 มีอัตราการติดเชื้อโรคหนองในเทียมเพิ่มขึ้นเป็นอย่างมาก ขณะที่โรคติดต่อทางเพศสัมพันธ์ชนิดอื่นๆ เช่น ซิฟิลิส ไวรัสตับอักเสบบี ไวรัสตับอักเสบซี และเอชไอวี มีการเปลี่ยนแปลงเพียงเล็กน้อยเมื่อเปรียบเทียบในช่วงระยะเวลาการศึกษา หญิงผู้ถูกล่วงละเมิดทางเพศส่วนใหญ่ช่วงอายุระหว่าง 10-19 ปี มีอัตราการติดเชื้อโรคติดต่อทางเพศสัมพันธ์มากที่สุด (ร้อยละ 14.54) การวิเคราะห์ถดถอยโลจิสติคเชิงพหุพบว่าการตรวจพบเม็ดเลือดขาวในปัสสาวะ เป็นปัจจัยที่มีความสัมพันธ์อย่างมีนัยสำคัญกับการติดเชื้อโรคติดต่อทางเพศสัมพันธ์ (adjusted odds ratio 4.85, $p < 0.001$)*

สรุป: *โรคติดต่อทางเพศสัมพันธ์พบได้บ่อยในหญิงผู้ถูกล่วงละเมิดทางเพศ โดยเฉพาะในกลุ่มอายุน้อย โดยเชื้อโรคหนองในเทียม เป็นเชื้อที่พบมากที่สุด การตรวจพบเม็ดเลือดขาวในปัสสาวะเป็นปัจจัยสำคัญที่สัมพันธ์กับการติดเชื้อโรคติดต่อทางเพศสัมพันธ์ ซึ่งการตรวจปัสสาวะเป็นเครื่องช่วยชี้วัดสำคัญในการวินิจฉัยโรคติดต่อทางเพศสัมพันธ์*

คำสำคัญ: *ผู้ถูกล่วงละเมิดทางเพศ, โรคติดต่อทางเพศสัมพันธ์, ปัจจัยสัมพันธ์*

Introduction

Sexual assault are critical global public health issues that disproportionately affect women, leading to profound physical and psychological harm. Globally, almost 1 in 3 women have experienced sexual assault at some point in their lives[1]. In the U.S., 43.6% of women experienced sexual violence in their life, which was almost double compared to men (24.8%)[2]. These abusive acts frequently result in an elevated risk of sexually transmitted infections (STIs) due to their often coercive and unprotected nature. According to the World Health Organization (WHO), in 2021, the prevalence of women experiencing physical and sexual violence between 2000 and 2018 was particularly high in regions such as the Pacific Islands (37%), South Asia (35%), and South-Eastern Asia (21%)[1]. The 1,465 cases of sexual assault reported by the Royal Thai Police in Thailand between October 2020 and August 2021 display alarming prevalence of sexual assault, rooted in entrenched sociocultural and systemic challenges. This statistic highlights the urgent need for coordinated interventions to prevent sexual assault and mitigate its health consequences, particularly the heightened risk of STIs among survivors[3]. Additionally, STI incidence continues to rise globally, with over 1 million new infections occurring daily, primarily through unprotected sexual contact[4]. In Thailand, incidence of major STIs, including syphilis, gonorrhea, chlamydia, chancroid, and lymphogranuloma venereum, was at 29.2 per 100,000 people in 2021, with syphilis being the most prevalent[5]. Given the strong association between sexual violence and STI transmission, this study aimed to assess the prevalence of STIs, including human immunodeficiency virus (HIV), gonorrhea, chlamydia, syphilis, hepatitis B, and hepatitis C, among sexual assault victims attending the Police General Hospital over the past five years. Furthermore, this study aimed to examine the prevalence of STIs and the factors associated with STIs among female sexual assault victims, offering critical insights to enhance prevention and treatment strategies.

Sexual assault generally refers to non-consensual or coerced actions such as vaginal or anal penetration by an object, finger, or penis, oral sex, fondling of the breasts or genital area, or forced contact with another individual's genitalia. This also encompasses situations where the victim is unable to provide consent due to intoxication, cognitive impairment, misperception because of age, or other forms of incapacitation[6, 7].

Materials and Methods

A retrospective review of medical records of female sexual assault victims who sought consultation at the Police General Hospital between January 2018 and December 2022 was conducted, with cases selected based on specific inclusion criteria. Sexual assault was defined as non-consensual sexual intercourse. At the Police General Hospital, all cases of suspected sexual assault are managed using a standardized protocol. This protocol includes a comprehensive clinical evaluation, consisting of a detailed history of the incident, physical examination, and forensic assessment. Evidence collection is performed using a sexual assault forensic examination kit, which includes swabs for biological samples, documentation of injuries, and other relevant forensic materials. This multidisciplinary approach ensures systematic documentation of both medical and forensic evidence to support diagnosis and subsequent management. The study was approved by the Ethics Committee of the Police General Hospital. Data were anonymized to ensure participant confidentiality, and all findings were meticulously documented in adherence to ethical standards.

Female sexual assault victims assessed using the standardized clinical and forensic protocols of the Police General Hospital for incidents reported between January 1, 2018, and December 31, 2022, were included in the study. Exclusion criteria were 1. Female victims of statutory rape, 2. Female sexual assault victims who denied sexual intercourse with vaginal penetration, 3. Female sexual assault victims with incomplete medical records, 4. Deceased female sexual assault victims, 5. Female sexual assault victims who refused medical evaluation, 6. Female sexual assault victims with a pre-existing history of HIV, hepatitis B, or hepatitis C infection.

Laboratory testing was conducted at the Police General Hospital's certified diagnostic laboratory, adhering to strict quality control measures and standardized protocols. Blood tests for hepatitis B surface antigen (HBsAg) and hepatitis C antibody (anti-HCV) were performed using chemiluminescent microparticle immunoassays (CMIA), both demonstrating 100% sensitivity and specificity exceeding 99% (Abbott Diagnostics Division, Ireland;[8] Abbott Diagnostics GmbH, Germany[9]). HIV was diagnosed using a rapid immunochromatographic assay for HIV-1/2 antibodies and p24 antigen, with 100% sensitivity and specificity of 99.96% and 99.76%, respectively (Abbott Diagnostics Medical Co., Ltd., Japan)[10]. Syphilis was identified using the venereal disease research laboratory test (Biorex Diagnostics Limited, United Kingdom)[11]. Pyuria was assessed through urinalysis and defined as ≥ 10 white blood cells/ high power field on microscopy. Vaginal swabs for Neisseria gonorrhoeae were analyzed using Gram staining to detect gram-negative diplococci, with culture for confirmation. Chlamydia trachomatis was diagnosed using the Chlamydia Rapid Test Cassette (CITEST Diagnostics Inc., Vancouver, Canada), with 96.6% accuracy, 93.3% sensitivity, and 97.5% specificity[12]. All test results were interpreted by licensed medical technologists and reviewed by experienced clinical microbiologists, ensuring high diagnostic accuracy and reliability.

Statistical analysis

Baseline characteristics were summarized as mean (standard deviation) for continuous variables and frequency (%) for categorical variables. Associations between sexually transmitted diseases and categorical variables among female sexual assault victims were assessed using the chi square test, and significant risk factors were identified through univariate and multivariate logistic regression using the forward stepwise method. All analyses were conducted using STATA software, version 16.0 (StataCorp, College Station, TX, USA), with statistical significance defined as $p < 0.05$.

Results

A total of 2,420 female sexual assault victims were initially included in the study. Following the exclusion of 1,414 cases of statutory rape, 161 without evidence of vaginal penetration, 334 with incomplete records, 98 who declined evaluation, and 13 with pre-existing STIs, the final analysis comprised 1,006 victims. Most female sexual assault victims (89.97%) involved a single assailant. Repeated assault occurred in 33.20% of cases. In 62.03% of the cases, the assailants ejaculated, while in 7.46% of cases, they did not; in 30.52% of cases, this information was unclear. Oral copulation of the victim's genitals was less common, occurring in 7.75% of cases. Only 6.26% of sexual assault victims involved anal penetration (Tables 1, 2).

Table 1. Basic information of female sexual assault victims (n = 1,006).

Characteristics	n	%
Age (year) of the victim	1,006	100%
≤ 9	72	7.16%
10-19	509	50.60%
20-29	261	25.94%
30-39	101	10.04%
40-49	42	4.17%
≥ 50	21	2.09%
Current/Highest Education	1,006	100%
No education/Less than primary school level	56	5.57%
Primary school	210	20.87%
High school	533	52.98%
Bachelor's degree	185	18.39%
Postgraduate level	17	1.69%
Unclear	5	0.50%
Occupations	1,006	100%
Unemployed	141	14.02%
Student	467	46.42%
General employee	167	16.60%
Government official	16	1.59%
Company employee	125	12.43%
Sex worker	39	3.88%
Private business	51	5.07%
Marital status	934	100%
Single	862	92.29%
Married	45	4.82%
Widow	27	2.89%
History of sexual Intercourse	1,006	100%
No	419	41.65%
Yes	569	56.56%
Unclear	18	1.79%
Pior Sexual Intercourse	569	100%
< 1 month	298	52.37%
1 - 3 months	73	12.83%
> 3 months	198	34.80%
Time to Medical Attention (days)	1,006	100%
< 3 days	505	50.20%
3 - 7 days	144	14.31%
> 7 days	357	35.49%

Table 2. Characteristics of female aexual assault victims (n = 1,006).

Characteristics	n	%
Number of Assailants	1,006	100%
1	911	90.56%
> 2	89	8.85%
Unclear	6	0.60%
Ejaculation	1,006	100%
No	75	7.46%
Yes	624	62.03%
Unclear	307	30.52%
Repeated Assault		
No	652	64.81%
es	334	33.20%
Unclear	20	1.99%
Oral copulation of victim's genitals	1,006	100%
No	869	86.38%
Yes	78	7.75%
Unclear	58	5.77%
Tried	1	0.10%
Anal penetration	1,006	100%
No	894	88.87%
Yes	63	6.26%
Unclear	48	4.77%
Tried	1	0.10%
Penetration of Vagina by finger	1,006	100%
No	823	81.81%
Yes	115	11.43%
Unclear	63	6.26%
Tried	5	0.50%
Vaginal douching after the incident by victim	1,006	100%
No	692	68.79%
Yes	299	29.72%
Unclear	15	1.49%
Condom use of assailant	1,006	100%
No	731	72.66%
Yes	125	12.23%
Unclear	150	14.91%

Among the 1,006 female sexual assault victims, 12.33% tested positive for at least one STI. Chlamydia trachomatis was the most prevalent (6.66%), followed by Neisseria gonorrhoeae (2.88%), syphilis (1.89%), hepatitis B (1.09%), HIV (0.99%), and hepatitis C (0.40%). Although STI prevalence fluctuated from 2018 to 2022, these changes were not statistically significant ($p > 0.05$). Overall, chlamydia positivity dramatically increased in 2022, while other infections, including syphilis, hepatitis B, HIV, and hepatitis C, showed minor variations over the years (Fig. 1).

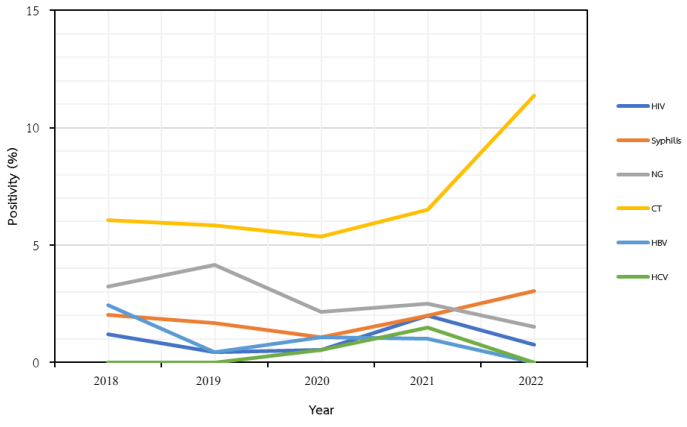

Fig. 1. Annual positivity rate of sexually transmitted infections in female sexual assault victims.

STI prevalence varied across age groups. Among the less than 9 years old age group, 2.78% tested positive for STIs, with Neisseria gonorrhoeae (1.39%) being the most common; no cases of HIV or syphilis were recorded. The 10–19 age group, the largest demographic, had the highest STI prevalence (14.54%), with Chlamydia trachomatis (8.45%) and Neisseria gonorrhoeae (4.52%) being the most frequent infections. In the 20–29 age group, 13.03% tested positive for STIs, with higher rates of HIV (1.92%) and syphilis (2.68%) compared to younger groups. The prevalence of STIs generally decreased with age, except in those aged 50 years and above, where the prevalence was 14.29%, with hepatitis B (9.52%) being the most common. No cases of Chlamydia trachomatis or HIV were found in this group, but syphilis (4.76%) and Neisseria gonorrhoeae (4.76%) were present (Fig. 2).

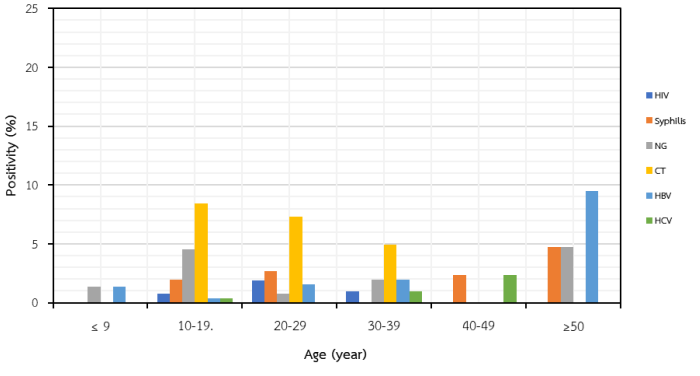

Fig. 2. Prevalence of sexually transmitted infections in female sexual assault victims by age.

Multivariate analysis identified pyuria as a strong predictor of sexually transmitted infections (STIs) (adjusted odds ratio 4.85, 95% confidence interval: 2.92–8.07, $p < 0.001$). In contrast, associations observed in univariate analysis, such as prior sexual intercourse and repeated sexual assault, were attenuated after adjustment. Other factors, including age, substance use, alcohol consumption, and sexual behaviors, were not significantly associated with STI risk (Table 3).

Table 3. Factors correlated with clinically Important sexually transmitted infections by multivariate logistic regression analysis (n = 1,006).

Factors	Univariate regression			Multivariate regression		
	OR	95%CI	p value	aOR	95%CI	p value
Age (ref.: ≥ 40)						
≤ 19	1.75	0.68-4.49	0.248			
20-39	1.56	0.59-4.11	0.365			
Substance abused (ref.: no)	0.94	0.33-2.71	0.907			
Alcohol consumption (ref.: no)	1.12	0.69-1.81	0.659			
Ejaculation (ref.: no)	2.15	0.84-5.48	0.110			
Pyuria (ref.: negative)	4.85	2.92-8.07	< 0.001*	4.74	2.84-7.91	< 0.001*
Prior sexual intercourse (ref.: no)	1.53	1.03-2.28	0.037*	1.37	0.90-2.09	0.138
Time to medical attention (ref.: < 7 day)	1.04	0.70-1.54	0.842			
Number of assailants (ref.: < 2)	1.36	0.74-2.49	0.320			
Condom use of assailant (ref.: yes)	0.62	0.32-1.20	0.157			
Repeated assault (ref.: no)	0.62	0.40-0.96	0.031*	0.69	0.44-1.09	0.110
Oral copulation of victim's genitals (ref.: no)	0.76	0.36-1.63	0.488			
Anal penetration (ref.: no)	0.72	0.30-1.71	0.456			
Penetration of vagina by finger (ref.: no)	0.87	0.47-1.61	0.660			
Vaginal douching after the incident (ref.: yes)	1.23	0.83-1.84	0.305			

* p value <0.05

OR: odds ratio, CI: confidence interval, aOR: adjusted odds ratio.

Discussion

Sexual assault is a critical public health issue that disproportionately affects women and significantly increases their risk of STIs. This study highlighted the vulnerability of younger females to sexual assault, with over half (50.60%) of the 1,006 female victims aged 10–19 years. The majority of them were students (46.42%). Repeated assault (33.20%) and lack of condom use (72.66%) were common, potentially leading to STIs. Chlamydia trachomatis (6.66%) and Neisseria gonorrhoeae (2.88%) were the most prevalent infections. The notable rise in Chlamydia positivity in 2022 was consistent with national data from the United Kingdom, which reported a 22.2% increase in Chlamydia diagnoses from 2021 to 2022[13]. According to Thailand's Department of Disease Control, there was an increase in STI incidence from 2.7 per 100,000 in 2021 to 5.1 per 100,000 in 2023. This trend may be attributed to inconsistent condom use. Behavioral surveillance data indicates that only 40.4% of male vocational students consistently utilized condoms with romantic partners. Although the usage rate was slightly higher with sex workers and casual partners, it remains insufficient and reflects a significant gap in preventive practices[14]. These findings illustrate the urgent need to address systemic barriers to sexual health education and expand access to preventive services. Moreover, the increased prevalence of STIs emphasizes the critical importance of early detection and effective treatment to prevent severe health complications, including pelvic inflammatory disease and infertility.

The overall prevalence of STIs in this study was 12.33%, indicating a substantial burden of infection within the examined population. These findings aligned with data from the Netherlands (11.2%), where Chlamydia trachomatis and Neisseria gonorrhoeae were tested using the gold standard polymerase chain

reaction (PCR). Although different laboratory tests, including Chlamydia rapid test for Chlamydia trachomatis and Gram staining/culture for Neisseria gonorrhoeae, were used in this study, the prevalence rates were similar[15]. In contrast, South Korea reported a significantly higher overall STI prevalence of 60.2%, largely attributed to integrated care models and aggressive screening techniques, particularly those using PCR for Chlamydia trachomatis, Neisseria gonorrhoeae, Mycoplasma genitalium, Mycoplasma hominis, Ureaplasma urealyticum, Trichomonas vaginalis, and cytomegalovirus[16]. Chlamydia trachomatis (6.66%) and Neisseria gonorrhoeae (2.88%) were the most common STIs in this study. These findings were comparable to data from France, where the prevalence of Chlamydia trachomatis and Neisseria gonorrhoeae were 8.2% and 2.3%, respectively[17]. In South Korea, Ureaplasma urealyticum was the most detected STI, while Chlamydia trachomatis ranked third at 17.4%, and Neisseria gonorrhoeae had a prevalence of 2.8%[16]. This disparity could be caused by regional differences and testing methods; thus, standardized testing methods are important to improve detection rates. The presence of pyuria as a significant predictor of STI risk, with an adjusted odds ratio (aOR) of 4.85 (95% CI: 2.92–8.07, $p < 0.001$), was consistent with studies from South Korea[16,18]. Pyuria is a non-invasive and early indicator; its routine use in post-assault care could suggest the presence of STIs, leading to earlier detection and serving as a valuable diagnostic clue.

Adolescents were the most vulnerable group in this study, with an STI prevalence of 14.54% among those aged 10–19 years. This finding was consistent with other national data, such as in South Korea (48.19%–68% of STIs at the age of 15–19 years[16,18] and Brazil (32.6% of STIs at the age of 10–19 years[19]. However, in Thailand, Suthaporn et al (2014) reported a 25.6% risk of STIs among victims aged 18–39, which was higher than the 20.9% risk observed among those aged 13–17. The higher prevalence of STIs in the 18–39 age group may be attributed to the broader age range[20]. The 20–29 age group exhibited a notable STI prevalence of 13.03% in this study. This finding was consistent with data from the United Kingdom (2021), which reported a 26.5% increase in STI diagnoses among individuals aged 20–24. Although condom use was not found to be a significant clinical factor in this study, its absence remains a plausible risk factor, particularly given the rising trend in condomless sexual activity, which is widely associated with an increased risk of STIs[13]. The age group 50 years and above, though smaller, showed high prevalence (14.29%), likely due to age-related physiological changes, such as reduced mucosal integrity, and barriers to healthcare access. Targeted interventions for adolescents should include early medical intervention and sexual harassment prevention training to empower them to recognize inappropriate behaviors, identify early warning signs, and report incidents confidently. Strengthening online safety measures and fostering open communication with trusted adults are essential strategies to mitigate risks and improve health outcomes. For older adults, interventions should focus on addressing their unique vulnerabilities by enhancing access to care through mobile clinics, telemedicine, and provider awareness campaigns.

Timely access to medical care is critical for forensic evidence collection, prevention of STIs, and pregnancy. Only 50.20% of victims in this study received treatment within the 72-hour window. These findings were comparable to those of Suthaporn et al (2014)[20], where only 49.4% of individuals aged 13–17 years sought medical consultation within 72 hours, compared to 76.8% of those aged 18–39 years. Delayed medical care reduces the effectiveness of post-exposure prophylaxis for STIs and emergency contraception. In Thailand, barriers to timely care may result from sociocultural factors, stigma, and inadequate support systems. By comparison, South

Korea has reported a substantially higher rate of early intervention, with 77.2% of individuals seeking care within the first 24 hours[16]. Efficient healthcare system, strong legal support, and public awareness campaigns are considered key factors contributing to timely post-sexual assault consultations in South Korea.

This study's strengths included data collection from the Police General Hospital, a primary referral center for sexual assault victims in Thailand, which provided a large and diverse five-year dataset. The substantial sample size enhanced the reliability of the findings and supports their applicability to similar urban contexts.

However, the retrospective design may have resulted in incomplete data. The absence of baseline pyuria data limits the ability to determine whether observed pyuria was pre-existing or assault-related, potentially confounding its association with STIs. The Chlamydia rapid test, while practical, may have underestimated Chlamydia trachomatis prevalence compared to PCR testing[12, 21]. Additionally, the use of vaginal swabs for detecting Neisseria gonorrhoeae via Gram staining, rather than endocervical swabs, may have reduced sensitivity and led to underestimation of prevalence, despite confirmatory culture. Infections with long latency periods, such as hepatitis B, hepatitis C, and HIV, may have been underreported due to the lack of follow-up testing. Findings from a single urban hospital may also not generalize to rural or more diverse populations. Future research should employ prospective designs, utilize gold-standard diagnostics, and include broader sampling to enhance accuracy and generalizability.

The Centers for Disease Control and Prevention (CDC) emphasize the critical need for early medical intervention and comprehensive care for sexual assault victims. CDC guidelines recommend empiric treatment for common STIs, along with hepatitis B and human papilloma virus vaccinations[22, 23]. In Thailand, although these international guidelines are widely applied, providing practical care remains challenging, particularly in rural areas with limited resources. Adapting international clinical guidelines to local protocols is essential for effective care. A holistic approach should encompass not only medical treatment but also psychological, social, and preventive care. Immediate STI screening, vaccination, and follow-up care are necessary to monitor the health of victims. Psychosocial support is required to address the emotional trauma following sexual assault. Expanding educational outreach should be endorsed to raise awareness about STI prevention. Promoting early intervention is also necessary. The high rate of repeated assault observed in this study (33.20%) emphasizes the urgent need for safe and supportive spaces to protect victims from further harm. These spaces, whether situated within communities, hospitals, or specialized care facilities should be staffed by professionals trained in victim-centered care to prioritize safety, foster recovery, and empower survivors. Additionally, implementing a comprehensive, multidisciplinary care framework that integrates medical treatment, legal advocacy, and social support is essential to address the multifaceted and intersecting needs of sexual assault survivors effectively.

Conclusion

Sexually transmitted infections were notably prevalent among female sexual assault victims, particularly those aged 10–19 years, with Chlamydia trachomatis and Neisseria gonorrhoeae being the most commonly identified infections. Pyuria was significant risk factors for STIs. Delays in accessing healthcare, reported in nearly half of cases, highlight critical shortcomings in post-assault medical services. These findings emphasized the urgent need for targeted prevention strategies, timely medical interventions, and standardized care protocols to improve health outcomes in this vulnerable population.

Potential conflicts of interest

The authors declare no conflicts of interest.

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