Sexually Transmitted Infections in the Young: Opening Up

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The speaker intends to:

A. **Describe the epidemiologic pattern of sexually transmitted infections (STI)**

B. **Characterize the clinical features of STI in different pediatric age group**

C. **Impart what's new in laboratory testing for sexually transmitted infections**

- There are nearly 30 sexually transmitted infections or disease syndromes that result from having sexually transmitted organisms.

Sexually Transmitted Infections

BACTERIA

- Gonorrhea (Neisseria gonorrhea)
- Chlamydia (Chlamydia trachomatis)
- Syphilis (Treponema pallidum)
- Chancroid (Haemophilus ducreyi)

VIRUS

- Genital warts and cervical – associated malignancy (human papillomavirus)
- Genital herpes (herpes simplex virus)
- Hepatitis B (hepatitis B virus)

Sexually Transmitted Infections

PARASITES

- Trichomoniasis (Trichomonas vaginalis)
- Pubic lice (Phthirus pubis)

Sexually Transmitted Infections

- **CURABLE**
  - Gonorrhea
  - Chlamydia
  - Syphilis
  - Trichomoniasis
- **INCURABLE**
  - Herpes simplex
  - genital warts
  - HIV

Moley, David. Epidemiology of sexually transmitted infections: worldwide. Epidemiology and Sexual Behavior. Medicine 42:6. 2014

Risk Factors in STI Spread

A. **Biological**

- gender
- age
- coexistence of other STIs
- pregnancy

B. **Behavioral**

- age at coital debut
- multiple sex partners
- sexual practice
- anal sex

C. **Demographic**

- population age structure
- sex ratio

Da Ros, Carlos. Global Epidemiology of Sexually Transmitted Diseases. Asian J of Andrology, 2008

Routes of Transmission

A. Sexual

B. Maternal
    1. in – utero transmission (syphilis)
    2. perinatal (gonorrhea, chlamydia, HPV, HSV)

C. Non-sexual: genital hygiene; fomites

Lewin, Linda. Seuxally Transmitted Infections in Preadolescent Children J. of Pediatric Health Care. 2007

Global Epidemiology of Sexually Transmitted Infections (STI)

- Profound impact on sexual and reproductive health worldwide
- More than 1 million STIs are acquired everyday worldwide with more than 2/3 in developing countries
- Each year, there are estimated 357M new infections with 1 of 4 STIs..chlamydia (101 M), gonorrhea (78M), syphilis (5.6M) and trichomoniasis (143 M)
- More than 500M living with genital HSV (herpes) infection
- More than 290 M women have an HPV infection

WHO Fact Sheet on STIs. August 2016. Kael Dehne. STI among adolescents: The Need for Adequate Health Services. Dept. of Child and Adolescent Health & Devt (CAH). 2005. WHO

Epidemiology of STI in the Pediatric Age Group

- Every year one (1) in 20 adolescents contract a major curable STI
- STI disproportionally affect women and adolescent girls
- Age of acquisition is becoming younger. There is relatively high prevalence of genital chlamydial infection in the youth. Similarly, highest prevalence of HPV infections occur among adolescents aged 14 – 19 years.
- In sexually abused children, gonorrhea remains to be the most frequently transmitted disease; concurrent chlamydia infection is common
- Among sexually abused children, 36 – 83% of 0-12 years had gonorrhea and 90 -100% of 5 -12 years of age has sexual contacts
- With less than 1% of this age group brought to STD clinics, pediatric STIs remain a hidden and neglected problem.

Velmonte, M. Sexually Transmitted Infection (STI) in the Forgotten Age Group. Presented during the 18th Annual Convention, 2011. Rogstad, K. Sexually transmitted infections in children and adolescents. Medicine 42:6. 2014; Pandhi, D. Sexually Transmitted Diseases in Children. J. Derma, 2003. Lewin, Linda. Sexually Transmitted Infections in Preadolescent Children. J of Pediatric Health Care, 2007. Rogstad, K. Sexually transmitted infections in children and adolescents. Medicine 40:6

In the Philippines, aside from the behavioral and HIV sentinel seroprevalence data, reliable STI data are rarely collected.

STI reports and surveys are currently inadequate to describe the true prevalence and trends of common STI in the country.

Wi, E.et.al. RT/STI prevalence in Selected Sites in the Philippines. Dept of Health. Women's Health and Safe Motherhoos Project. Family Health Internationa. 2002

Prevalence of STIs among different groups RTI/STI Prevalence Survey in Selected Sites in the Philippines February – May 2002 (n = 300)

STI	Female (Gen. Pop'n)	Male (Gen. Pop'n)	Female Youth 15 – 24 y/o	Male youth 18-24 y/o
Chlamydial infection	5.75	4.74	7.7	9
Gonorrhea	0.75	1.1	0.7	1.7
Syphilis	0.17	0.2	No data	Not applicable
Hepatitis B	3.2	9.6	No data	Not applicable
Trichomoniasis	3.18	Not applicable	No data	Not applicable
Bacterial vaginosis	28.56	Not applicable	No data	Not applicable
Candidiasis	17.16	Not applicable	No data	Not applicable

Epidemiology Bureau (EB) Data
National HIV/AIDs & STI Surveillance and Strategic Information Unit. Department of Health, Philippines

Number of Syphilis screening tests done and Number of reactive test by year and by sex

YEAR	Total Number of Clients Screened for SYPHILIS			Total Number of Tests reactive for SYPHILIS		
	Male	Female	TOTAL	Male	Female	TOTAL
2012	----------	----------	344, 572	----------	----------	1,923
2013	384, 703	326, 909	711, 612	3,401	1,968	5,369
2014	511,973	447,863	959, 836	3,125	4,453	7,578
2015	349,081	309,645	658,726	2,021	2,386	4,407

Epidemiology Bureau (EB) Data
National HIV/AIDs & STI Surveillance and Strategic Information Unit. Department of Health, Philippines

Number of smears for GONORRHEA and Number of smears with intracellular diplococci by year and by sex

YEAR	Total Number of Smears			No. of smears with intracellular diplococci		
	Male	Female	TOTAL	Male	Female	TOTAL
2012	----------	----------	174, 717	----------	----------	3,445
2013	10,663	141,049	151, 712	1,928	1,972	3,900
2014	14, 811	146, 442	161, 253	2,435	3,196	5,631
2015	7,579	75, 778	83, 357	2,063	1, 785	3,848

Research Institute for Tropical Medicine Pediatric Data : 2016 – 1st Q 2017

DISEASE		
	2016	1st quarter 2017
Gonorrhea		
culture proven	2	2 (4F y/o ; 13M)
Syphilis		
RPR / TPPA	1 +/+	1 -/+ (2-month old)
Herpes Simplex (HSV)		
PCR	0	2 (1-month old)
Chlamydia	0	0
Trichomonas	0	0

Philippine Children's Medical Center Pediatric Gynecology and Adolescent Center OPD Data : 2014 - 2016

Disease	2014		2015		2016	
	Male	Female	Male	Female	Male	Female
HSV	No data	1	0	0	1	1
PID	Not applicable	1	Not applicable	0	Not applicable	4
Gonococcal urethritis	No data	0	5	0	0	2
Unspecified STI						1

DISEASE FEATURES

GONORRHEA

- infects urethra, estrogenized endocervix, conjunctivae, prepubertal vagina, pharynx, and anorectum ; can be disseminated (arthritis – dermatitis syndrome

- perinatal colonization can persist for up to 6 months

- beyond neonatal period, trasmission is almost always sexual

- transmission through fomites (toilet seats, towels)possible; can survive up to 24 hours in moist purulent sections

Jain, Nita. Sexually transmitted diseases in the pediatric patient. BCMJ. Vol. 46. No.3 April 2004

GONORRHEA FEATURES

NEONATES	CHILDREN	ADOLESCENTS
purulent conjunctivitis within 2 – 5 days from birth	Conjunctivitis, exudative oropharyngitis, urethritis, infection of the vagina, endocervix and rectum	Same as for adults but with increased risk of PID
	Infection of the vagina and urethra usually with yellow or green discharge with odor associated with painful urination or itching	In females: 85% asymptomatic

Rogstad, Karen.Sexually transmitted infections in chiidlren and adolescents. Medicine 42:6. 10`4.
Dehne, Karl. Adolescence, sexuality and STIs. Dept. of Child & Adolescent Health and Devt. 2005

CHLAMYDIA INFECTION

- bacterial agent associated with neonatal conjunctivitis, trachoma, pneumonia in young infants, genital tract infection, pharyngitis and lymphogranuloma venereum.
- In children younger than 3 years old, consider perinatal colonization
- GUT infections in older than 3 years is indicative of sexual acquisition
- Fomite transmission not documented

Jain, Nita. Sexuallty transmitted diseases in the pediatric patient. BCMJ. Vol.46, No.3, April 2004

CHLAMYDIA FEATURES

NEONATES	CHILDREN	ADOLESCENTS
Vertical transmission: conjunctivitis, 5 -14 days after birth	Usually asymptomatic irrespective of site of infection	Same as for adults but with increased risk of PID
pneumonia		
Asymptomatic infection of vagina and rectum occurs in up to 15% of infants of infected mothers, and infection may persist for up to 3 years		In females: purulent vaginal discharge In males: urethral discharge, painful urination and itching

Jain, Nita. Sexually transmitted diseases in the pediatric patient, BCMJ Vol 46, No.3, April 2004. Rogstad, Karen,et.al. Sexually transmitted infections in children and adolescents. Presentations and Principles of Management. Medicine 42:6. Lewin, Linda. Sexually Transmitted infections in preadolescent children. J of Pediatric Health Care. 2007

SYPHILIS

- Motile spirochete
- Infection can occur in utero (congenital) at anytime of pregnancy or at birth
- Acquired is almost always obtained through sexual contact
- In any young child who presents with primary or secondary disease think : SEXUAL ABUSE

SYPHILIS FEATURES

- **PRIMARY:** ulcer or chancre at infection site
- **SECONDARY:** skin rash, mucocutaneous lesion, lymphadenopathy
- **TERTIARY:** multiorgan abnormalities – cardiac, respiratory, ear or gummatous lesions
- **CONGENITAL:** early (< 2 years old): may be normal at birth with signs developing at 3- 12 weeks

  late (> 2 years old): bone and CNS involvement

Da Ros,Carlos. Global Epidemiology of sexually transmitted diseases. Asian J Androll 2008; 10 (1): 110 -114

TRICHOMONIASIS

- Flagellated protozoa
- Transmitted by direct genital contact or from infected mother to neonate
- Neonatal infection can persist up to 1 year
- Beyond infancy, presence of organism in a vaginal specimen is highly suggestive of sexual abuse
- Fomite transmission undocumented

Lewin, Linda. Sexually transmitted infections in preadolescent children. J of Pediatr Health Care. 2008

TRICHOMONIASIS FEATURES

- Among neonates, post- delivery infection persists for 3-6 weeks in the oestrogenized vagina, can persist in the urinary tract after clearance from the vagina

- In girls of all ages, vulvovaginitis with discharge occurs ; may be asymptomatic in boys

Rogstad, Karen et.al. Sexually transmitted infections in children and adolescents. Mediicine 42: 6. 2014. Lewin, Linda. Sexually transmitted infections in preadolescent children. J of Pediatric Health Care. 2007

HERPES GENITALIS (HSV)

- Majority caused by HSV type 2
- Either HSV -1 or HSV -2 can be found in the oral or genital region
- Perinatal transmission of HSV 2 can occur by ascending infection or during birth through an infected maternal genital tract

Jain, Nita. Sexually transmitted diseases in the pediatric patient. BCMJ. Vol 46, No.3, April 2004. Da Ros , Carlos. Global Epidemiology of sexually transmitted diseases. Asian J of Andrology, 2008

HERPES GENITALIS FEATURES

NEONATES	CHILDREN AND ADOLESCENTS
Localized skin lesions	Painful, vesicular or ulcerative lesions of the skin and mucous membranes fo the male or female genital tract
Encephalitis or disseminated infection	

Rogstad, KE. Sexually transmitted infections in children and adolescents. Presentation and Principles of Management. Medicine 42:6. Da Ros,CT. Global Epidemiology of sexually transmitted diseases. Asian J of Andrology, 2008. Lewin, LC. Sexually transmited infections in preadolescent children. J of Pediatric Health Care. 2007

GENITAL WARTS (HPV)

- More than 100 types of HPV and nearly 40 types associated with genital area infection
- Perinatal transmission occurs
- Autoinoculation or heteroinoculation from scratching, bathing or diapering

Da Ros, CT. Global epidemiology of sexually transmitted diseases. Asian J of Andrology. 2008. Rogstad, KE. Sexually transmitted infections in children and adolescents. Presentation and Principles of Management. Medicine 42:6. 2014

GENITAL WARTS (HPV) FEATURES

- Also called condylomata acuminata : painless, clustered cauliflower - like lesions on skin or mucosal surfaces

  In males, found on the penis, scrotum or anal or perianal area.

  In females, appear on the vulva, anal or perianal area, vagina or on the cervix

- Juvenile recurrent respiratory papillomatosis

Rogstad, KE. Sexually transmitted infections in children and adolescents. Medicin 42:6, 2014. WHO. Sexually Transmitted Infections, Issues in Adolescent Health and Development, 2004. Redbook. 2015 Report of the Committee on Infectious Disease

DIAGNOSTIC TESTS

THE TRADITIONAL

DISEASE	GOLD STANDARD
Gonorrhea	Culture (infected specimens)
Chlamydia infections	Isolating chlamydial intracellular inclusions in tissue culture
Syphilis	Spirochetes seen by microscopic darkfield examination of lesion exudate, tissue or infected specimens
Trichomoniasis	Protozoan seen in the urine or a wet mount of the vaginal discharge
Herpes genitalis (HSV)	Viral cell culture
Genital Warts (HPV)	Tissue biopsy

THE INNOVATIONS

GONORRHEA AND CHLAMYDIA: CDC RECOMMENDATIONS

- NAAT is the recommended test to diagnose genitourinary gonorrhea and chlamydia infections regardless of symptomatology
- Optimal specimen types for NAAT: first catch urine (10cc)

  from men and vaginal swabs from women
- Alternate specimens: urine or cervical swab from women; urethral swab from men
- NAAT also recommended for detection of rectal and oropharyngeal infections caused by chlamydia or gonorrhea

Carmine, Linda et.al. Testing and Treatment for Sexually Transmiited Infections in Adolescents – What's New?.. J Pediatr Adolesc Gunecol 27 (2014) 50 - 60

THE INNOVATIONS

TRICHOMONAS VAGINALIS

- Methodologies clinically available:

TEST	SENSITIVITY
NAAT	98 – 100%
CULTURE	75 – 77%
RAPID ANTIGEN	82 – 85%
WET MOUNT	50 %

Carmine, Linda et.al. Testing and Treatment for Sexually Transmiited Infections in Adolescents – What's New?.. J Pediatr Adolesc Gunecol 27 (2014) 50 - 60

THE INNOVATIONS

SYPHILIS

- **Definitive methods:** darkfield microscopy
  direct fluorescent antibody (DFA)

- **Serologic tests**
  Nontreponemal: VDRL and RPR
  Treponemal : Fluorescent Treponemal Antibody absorbed (FTA – ABS)
  T. pallidum particle agglutination (TP-PA)

THE INNOVATIONS

2009 Expert Consultation Meeting of the CDC and the Association of Public Health Laboraty findings on SYPHILIS

1. darkfield microscopy continues to be useful in the diagnosis of syphilis
2. proper serologic diagnosis of syphilis requires both a treponemal test and a nontreponemal test
3. since the standard of screening with a non-treponemal test is labor intensive, screening with an efficient treponemal test (reverse algorithm) as the initial screen is proposed for consideration.

THE INNOVATIONS

HERPES SIMPLEX VIRUS (HSV)

- culture and PCR on clinical lesions
- HSV – 1 and HSV – 2 antibody detection to document prior infection
- HSV – 1 and HSV – 2 PCR to test for current infections
- HSV DFA for direct microscopy of specimen

Carmine, Linda et.al. Testing and Treatment for sexually transmitted infections in Adolescents- What's New. J Pediatr Adoles Gynecology. 27(2014) 50-60.

TAKE HOME POINTS

- Current available data reveal that the major curable STIs remain the same but the age of acquisition is becoming younger.
- In sexually abused children, gonorrhea remains to be the most frequently encountered STI
- There is a need for a more robust and reliable STI data in children in the country.
- Despite the innovations in diagnosis, local laboratory facilities continue to utilize the traditional tests for determination of sexual transmitted infections.

THANK YOU