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Syphilis in Pregnancy: Education to Increase Knowledge in Reproductive Couples

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ABSTRACT

Background: Syphilis is believed to be one of the oldest diseases, first discovered in the late 15th century. Indonesian Ministry of Health reported a total of 76,923 new cases in 2020. WHO has set an ambitious target to reduce the incidence by 90% before 2030, in spite of slow global response. This number is lower than the number obtained in 2019, which was 4,169 people. Syphilis can be transmitted through sexual contact, blood transfusion, and vertical mother-to-child transmission (MTCT). It is estimated that the risk of transplacental infection ranges from 20-80%, depending on various factors, such as the stage of infection in the mother. This study aimed to assess the effect of counseling in increasing patient knowledge of syphilis cases in pregnancy.

Subjects and Method: This was a quasi experiment conducted at obstetrics and gynecology department in Dr. Moewardi Hospital, Surakarta, Central Java, Indonesia, in June 2025. A sample of 84 pregnant women was selected for this study. The independent variable was counselling. The dependent variable was knowledge about Syphilis in pregnancy. Knowledge was tested before and after counselling. The data were examined using independent t test.

Results: The knowledge score of pregnant women about syphilis after the intervention (Mean= 77.14; SD= 13.85) was higher than before (Mean= 56.43; SD= 15.88), and it was statistically significant (p <0.001).

Conclusion: The results of this study indicate that this recovery is effective in improving understanding of syphilis cases in pregnancy in obgyn polyclinic patients at Dr. Moewardi Hospital.

Keywords: counseling, pregnancy, syphilis

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BACKGROUND

Syphilis is believed to be one of the oldest diseases, first discovered in the late 15th century. In the past, syphilis was considered a psychiatric disease and not an infectious disease. In 1901, IIya Mechnikov discovered the infectious nature of the disease when he inoculated monkeys with T. pallidum. About 10-12 million new syphilis infections arise worldwide each year according to the World Health Organization. Infection rates vary significantly between countries that have different demographic populations. Generally, infection rates among pregnant women are low in high-income countries (HICs). It is estimated to be around 0.02% - 4.5% in Europe and the United States. Syphilis is a chronic systemic disease caused by the bacterium Treponema pallidum (T. pallidum) that causes venereal infections (Katz et al., 2012). Treponema pallidum is a gram-negative bacterium (Plagens-Rotman et al., 2019, 2021). The genus Treponema is a spiral-shaped bacterium with a phospholipid-rich outer membrane that belongs to the spirochetal order. It has a slow metabolic rate, as it takes an average of 30 hours to multiply. However, other subspecies of Treponema cause non-sexual contact-borne diseases. All Treponematoses have similar DNA but differ in their geographical distribution and pathogenesis. The only host for these organisms is humans and there are no animal reservoirs (Katz et al., 2012; Tudor et al., 2024).

According to the Director General of P2P of the Indonesian Ministry of Health in 2020, there were 3,295 pregnant women with syphilis out of 39,660 pregnant women who were screened for syphilis during pregnancy check-ups (ANC). This number is lower than the number obtained in 2019, which was 4,169 people. Then in 2088, WHO estimates that there will be 1.4 billion pregnant women with probable active syphilis (PAS) or syphilis infection active enough to cause mother-to-child transmission (MTCT), with an estimated 52% of PAS cases resulting in adverse pregnancy outcome (APO). Syphilis can be transmitted through sexual contact, blood transfusion, and vertical mother-to-child transmission (MTCT). The estimated risk of transplacental infection ranges from 20-80%, depending on various factors, such as the stage of infection in the mother. This is well above the estimated 20% risk of mother-to-child transmission of HIV (Ministry of Health Republik Indonesia, 2022).

In this service, counseling will be carried out with the target of the wider community in general, not only for pregnant women. Pengabdi as a Specialist Doctor of Obstetrics and Gynecology provides counseling about syphilis which is expected to increase awareness and concern of the community, health workers, pregnant women, or non-pregnant women in efforts to prevent and treat syphilis through community service methods.

SUBJECTS AND METHOD

1. Study Design

The study was a cross-sectional study held on Tuesday, June 25, 2024 through counseling at the obstetric clinic of Dr. Moewardi Hospital.

2. Population and Subject

The target population is patients and families of patients who come to the Obstetric and gynecology clinic of Moewardi's Hospital. Sample collection was random sampling, and 84 samples were obtained for this study.

3. Study Variable

The dependent variable of this study is knowledge about Syphilis in pregnancy which is then tested using pretest and posttest. The independent variable of this study

is the knowledge gained by patients and families of patients who are checking at obstetric and genecology clinic of Moewardi's Hospital.

4. Operational Definition of Variable

Education through learning in the form of counseling for patients and families of patients at Obstetric and gynecology clinic of Moewardi's Hospital.

Knowledge of syphilis in pregnancy in the form of concepts and understanding obtained about syphilis in pregnancy signs, symptoms to handling.

5. Study Instrument

This study used a questionnaire to assess participants' understanding of the material. This study tested the validity and reliability of the questionnaire to demonstrate the range of its outcomes.

6. Data Analysis

The counseling conducted in June will be analyzed using SPSS, the results of the pretest and posttest will be analyzed using the Paired T test if normally distributed.

7. Research Ethics

This study has obtained Ethical Clearance from Dr. Moewardi Hospital, Surakarta, Indonesia, No. 1.618/VI/HREC/2024, on June 25, 2024.

RESULTS

1. Sample Characteristics

Sample collection was random sampling, and 84 samples were obtained for this study. (Table 1).

2. Univariate Analysis

This counseling was held on Tuesday, June 25, 2024 using direct socialization media facilities accompanied by a question and answer discussion. The total sample population in this counseling was 60 participants, with participants coming from patients and families of patients in Obstetric and gunecology clinic of Moewardi's Hospital (Table 2).

The Kolmogorov-Smirnov normality test in table 2 shows that the data from both groups were distributed without passing normality ($p<0.05$). So the hypothesis test uses the Wilcoxon test.

3. Bivariate Analysis

The results in Table 3 show that the mean knowledge increased from (Mean=56,43; SD=15.88) to (Mean=80.00; SD=13.85) before and after the intervention (see Table 3). Table 3 shows that statistically, the post-test results are higher than the pretest results with a mean difference of 23.57 points, with a significance value $p<0.05$, which means there is a significant difference in pretest and posttest scores. In this study, it can be concluded that each variable received significant treatment. As a result, participants' knowledge about syphilis in pregnancy increased after attending this counseling.

Tabel 1. Sample Characteristics

Characteristics	Frequency (n)	Percentage (%)
Pregnant woman	24	28.6
Non-Pregnant	25	29.7
Patient family	35	41.7

Table 2. Normality test results using the Kolmogorov-Smirnov test

Group	n	Mean	p
Pretest	84	56.43	0.001
Posttest	84	80.00	<0.001

Table 3. Bivariate analysis mean score knowledge about syphilis in pregnancy in reproductive couple, before and after education learning through counseling

Group	N	Mean	Median	SD	p
Pretest	84	56.43	60.00	15.88	0.001
Posttest	84	77.14	80.00	13.85	<0.001

DISCUSSION

Syphilis is considered a sexually transmitted disease (STI) because most cases are transmitted by direct vaginal, anogenital, or urogenital contact with someone infected with active primary or secondary lesions. The infection is rarely contracted through non-sexual contact, such as skin-to-skin, or through blood transfer (blood/syringe transfusion). Vertical transmission occurs trans placentally, resulting in congenital syphilis (Kojima and Klausner, 2018; Tudor et al., 2024).

Maternal-to-fetal transmission of syphilis causes high morbidity and mortality as syphilis often leads to poor pregnancy outcome (APO). Adverse outcomes due to syphilis can include early miscarriage, stillbirth, premature birth, and low birth weight, among others. In addition, syphilis transmitted from mother to child can also cause congenital syphilis which often results in permanent sequelae such as saddle nose, Hutchinson's teeth, and mental retardation (Korenromp et al., 2020; World Health Organization, 2023).

Syphilis has different stages of the disease; each associated with different clinical manifestations. The first stage is primary syphilis, occurring 10-90 days after contact and characterized by the appearance of one or more chancres. The chancre, or ulcer durum, ranges from a few millimeters to 2 cm in diameter, well-demarcated with regularly indented borders, clean ulcer base, prominent edges. Chancre is usually painless. Chancre occurs at the point of inoculation depending on the type of sexual exposure. It may also be accompanied by inguinal lymphadenopathy (Çakmak et al., 2019; Katz et al., 2012).

The second stage is secondary syphilis, which is a systemic form that can spread to various organs and is caused by infection with other diseases. It can be a progression of primary syphilis. The clinical features are diverse and may not be preceded by detectable primary lesions so the diagnosis may be delayed. The disease may be accompanied by constitutional symptoms (such as fever, malaise, myalgia, arthralgia, sore throat, and headache).

The rash usually erupts 3-12 weeks after the appearance of the chancre, usually non-pruritic, different types of rashes may occur; erythematous macules or maculopapules usually appear symmetrically on the trunk, extremities including palms and soles. Other dermatologic manifestations include non-scarring patchy alopecia (moth-eaten), pustules or nodules around the mouth and nose, and highly contagious condyloma Lata. About 70% - 85% may experience painless generalized lymphadenopathy. The symptoms of secondary syphilis will subside even without treatment, but the disease will progress to the third stage (latent stage). The latent stage is a period with no visible signs or symptoms. Sero reactivity is the only evidence of infection. Asymptomatic patients who contracted syphilis within the past year are classified as early latent infections. If the infection has been acquired for more than 1 year, it is classified as late latent syphilis. About 15% of untreated latent syphilis will

progress to the tertiary stage, the rest will remain latent indefinitely. Tertiary syphilis can affect many different organ systems, such as the heart, eyes, and brain and can lead to death. Populations at risk of contracting syphilis are referred to as key populations (Katz et al., 2012).

There are 2 types of serologic diagnosis of syphilis in Indonesia, namely treponemal and non-treponemal tests. These are the main methods for early screening, diagnosis, and monitoring of disease activity. Early screening is part of the Ministry of Health's elimination strategy (Katz et al., 2012; Satyaputra et al., 2021).

Although syphilis screening is not routinely recommended in sexually active adolescents, it is recommended annually in MSM and in all pregnant women at the first prenatal visit (including adolescents). Screening high-risk men (HIV positive or MSM) every 3 months will increase early detection of syphilis. The RPR flocculation test can be used to assess disease activity While treponemal tests, such as TPHA (Treponema Pallidum Haemagglutination Assay), TP-PA (Treponema Pallidum Particle Agglutination Assay), FTA-ABS (Fluorescent Treponemal Antibody Absorption), and CLIA (IgG Chemiluminescence Immunoassay) can detect antibodies that are specific to Treponema and therefore rarely give false positive results. These tests can show reactive/ positive results for life, despite successful syphilis therapy. The treponemal test only indicates that a person has been infected with Treponema, it cannot distinguish between active infection and well-treated infection.

Syphilis during pregnancy is associated with preterm birth, spontaneous abortion, stillbirth, non-immune hydrops, perinatal death, and two syndromes characteristic of clinical disease (early and late congenital syphilis). Moreover, the placenta in infants with congenital syphilis is often large, thick, and pale. Histopathologic features include necrotizing funicitis ("barber's pole" appearance), enlarged villi, and acute villitis. Histopathology of the placenta and umbilical cord should be performed in every case of suspected syphilis. The clinical, laboratory, and radiographic abnormalities of congenital syphilis result from active T. pallidum infection and from the inflammatory response that occurs in various organs and tissues of the body. The majority of infants born to mothers with untreated syphilis appear normal and have no clinical or laboratory evidence indicating infection at birth, but may develop disease manifestations months to years later if untreated (Cooper and Sánchez, 2018).

The results of this study indicate that counseling can increase the participants' knowledge about syphilis in pregnancy. Knowledge about syphilis in pregnancy is important for patients and their families. Patients and the community have an important role for early detection of syphilis in pregnant women. Routine and structured counseling increases community knowledge about syphilis in pregnancy. Counseling is one of the choices as a means of education because of several advantages, namely shortening the time to learn about the disease, being cheap and facilitating socialization. The implementation of counseling on the topic of syphilis in pregnant women can be concluded to increase patient understanding as seen from the results of the participants' posttest scores which have increased compared to the pretest scores. This shows that in this study, the effectiveness of counseling to increase participants' knowledge was obtained.

According to the Centers for Disease Control and Prevention (CDC) STD treatment guidelines, early syphilis lasting less than 1 year (i.e., primary, secondary, or early

latent syphilis) should be treated with a single intramuscular (IM) injection of benzathine penicillin G 2.4 million units, regardless of HIV serostatus. However, 3 injections of benzathine penicillin G 2.4 million units are recommended for individuals who have had syphilis for more than 1 year (Klausner, 2019). The drug of choice for treatment of all stages of syphilis in all ages is penicillin class G (such as benzathine, aqueous procain, or aqueous crystalline). The dose, route, and duration of treatment depend on the stage of syphilis. Diseases with longer disease duration (latent disease of unknown duration, advanced latent, and tertiary require longer therapy. Alternative antibiotic therapies in non-pregnant children or adults allergic to penicillin are doxycycline 100 mg orally twice daily, tetracycline 500 mg 4 times daily for 14 days, and ceftriaxone (optimal dose and duration unknown). Pregnant women with penicillin allergy should be desensitized and treated with penicillin. Details of the treatment dose, route, and duration of treatment are described in Table 4.

Table 4. Treatment dose, route, and duration of treatment

Acquired Syphilis	Treatment
Primary or secondary	
Adult	Benzathine penicillin G 2.4 million units IM in a single dose
Child	Benzathine penicillin G 50,000 U/kg IM to maximum of 2.4 million units in a single dose
Early latent	
Adult	Benzathine penicillin G 2.4 million units IM in a single dose
Child	Benzathine penicillin G 50,000 U/kg IM to maximum of 2.4 million units in a single dose
Late latent or unknown duration	
Adult	Benzathine penicillin G 2.4 million units IM, weekly for 3 wk (7.2 million units total)
Child	Benzathine penicillin G 50,000 U/kg IM to maximum of 2.4 million units weekly for 3 wk (150,000 U/kg up to 7.2 million units total)
Tertiary with normal CSF	Benzathine penicillin G 2.4 million units IM, weekly for 3 wk (7.2 million units total)
Neurosyphilis or ocular syphilis	Aqueous crystalline penicillin G 18–24 million U/d (3–4 million units IV every 4 h for 10–14 d) OR Procaine penicillin G 2.4 million units IM once daily with probenecid 500 mg by mouth
Congenital syphilis	
Proven or probable	Aqueous crystalline penicillin G 50,000 U/kg/dose given every 12 h for the first 7 d of life and every 8 h thereafter for 10 d OR Procaine penicillin G 50,000 U/kg/d IM once daily for 10 d
Possible	Aqueous crystalline penicillin G 50,000 U/kg/dose given every 12 h in the first 7 d of life and every 8 h thereafter for 10 d OR Procaine penicillin G 50,000 U/kg/d IM once daily for 10 d OR Benzathine penicillin G 50,000 U/kg IM in a single dose
Late	Aqueous crystalline penicillin G 50,000 U/kg/dose given every 4–6 h for 10 d with or without benzathine penicillin G 50,000 U/kg IM in a single dose at the end of therapy OR Procaine penicillin G 50,000 U/kg/d IM once daily for 10 d OR Benzathine penicillin G 50,000 U/kg IM once a week for 3 wk

Clinical and serologic follow-up is required to document treatment response in case of treatment failure. The non-treponemal test titer should decrease 4-fold (e.g., from 1:32 to 1:8) within 6 to 12 months after appropriate treatment. If this change fails to occur, the patient should be monitored longer or treatment discontinued if follow-up is doubtful. If a 4-fold increase in titer or new symptoms, treatment failure or reinfection occurs and the patient needs to be tested for HIV and neurosyphilis, then re-administer penicillin G benzathine 2.4 million units intramuscularly (IM) weekly for 3 weeks or, if neurosyphilis is present, intravenous penicillin G for 10 to 14 days or procaine penicillin G IM daily with probenecid. Neurosyphilis patients should have repeated cerebrospinal fluid (CSF) examinations every 6 months until the cell count normalizes. If the cell count does not decrease after 6 months, re-treatment should be considered (Heston and Arnold, 2018).

Syphilis prevention efforts are needed at both the individual and population levels. At the individual level, the goal may be to reduce exposure (e.g. by reducing the number of sex partners), reduce the risk of infection after exposure (e.g. by providing prophylactic treatment against sexual contact), and reduce sequelae of infection (e.g. by treating early infection to reduce long-term sequelae). At the population level, the goal is to reduce the basic reproductive rate and the number of new infections caused by a single case. Early case identification and timely treatment will reduce the duration of infection, which is an important intervention to reduce the basic reproductive rate (Klausner, 2019).

AUTHORS CONTRIBUTION

Sri Sulistyowati is the main researcher who formulated conceptual framework. Muhammad Adrianes Bachnas, Eric Edwin Yuliantara, Nutria Widya Purna Anggraini, Wisnu Prabowo and Lini Astetri examined conceptual framework and methodology of the study. Aliffudin Nuur, M. Denny Gagah, Siti Khoeronisa and Oktantia Dyah plays role in processing and collecting data of the study.

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CONFLICT OF INTEREST

There is no conflict of interest related to this research.

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