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Epidemiological Burden of Syphilis Among Pregnant Women in ElNuhood Locality, West Kordofan State, Sudan

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Abstract

This study assessed the epidemiological burden of syphilis among pregnant women attending antenatal care (ANC) centers in El Nuhood locality, West Kordofan State, Sudan, from 2018 to 2021. A descriptive cross-sectional and intervention design was applied, involving 400 participants selected through systematic random sampling. The intervention lasted three months and included intensive health education on syphilis transmission and prevention, especially mother-to-child transmission, monthly follow-up, and periodic screening. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), with statistical significance determined by p-values.

Findings revealed notable gaps in knowledge about syphilis transmission and treatment, despite high ANC attendance. Most participants were young, married, and from low socioeconomic backgrounds. Knowledge of syphilis was significantly associated with both age and education level, while premature birth was significantly linked to syphilis positivity. The study emphasizes the urgent need to integrate routine syphilis testing into ANC services, alongside sustained awareness campaigns to reduce congenital syphilis and adverse maternal outcomes.

Keywords: Syphilis, Antenatal Care, Pregnant Women, Epidemiology, Maternal Health, Sudan

الملخص بالعربي

هذه الدراسة قامت بتقييم العبء الوبائي لمرض الزهري بين النساء الحوامل المترددات على مراكز رعاية ما قبل الولادة في محلية النهود، ولاية غرب كردفان، السودان، من عام 2018 إلى عام 2021. تم تطبيق تصميم وصفي مقطعي وتدخلي، شمل 400 مشاركة تم اختيارهن من خلال أخذ عينات عشوائية منتظمة. استمر التدخل لمدة ثلاثة أشهر وشمل تثقيفًا صحيًا مكثفًا حول انتقال مرض الزهري والوقاية منه، وخاصة انتقاله من الأم إلى الطفل، والمتابعة الشهرية، والفحص الدوري. تم تحليل البيانات باستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS)، مع تحديد الدلالة الإحصائية من خلال القيم الاحتمالية. كشفت النتائج عن وجود فجوات ملحوظة في المعرفة حول انتقال مرض الزهري وعلاجه، على الرغم من ارتفاع معدل الحضور في مراكز رعاية ما قبل الولادة. كان معظم المشاركات شابات ومتزوجات ومن خلفيات اجتماعية واقتصادية منخفضة. ارتبطت المعرفة بمرض الزهري ارتباطًا كبيرًا بكل من العمر والمستوى التعليمي، بينما ارتبطت الولادة المبكرة ارتباطًا كبيرًا بإيجابية مرض الزهري. وتؤكد الدراسة على الحاجة الملحة لدمج اختبار الزهري الروتيني في خدمات رعاية ما قبل الولادة، إلى جانب حملات التوعية المستدامة للحد من مرض الزهري الخلقي والنتائج السلبية للأمهات.

الكلمات المفتاحية :مرض الزهري، خدمات رعاية ما قبل الولادة، النساء الحوامل، الأمراض المعدية، الحمل، معدل الانتشار.

Introduction:

Syphilis remains a major global health concern, particularly in low- and middle-income countries (1). Among pregnant women, syphilis poses significant risks, including vertical transmission to the fetus, which may lead to congenital syphilis, stillbirth, or neonatal death (2). Despite the availability of effective treatments, limited awareness and insufficient screening practices continue to contribute to the burden of the disease (3).

Infection during pregnancy, when not detected early or not treated properly, poses a great risk to the fetus. Recent data reveals a pooled prevalence of syphilis infection among pregnant women of 0.8%, getting at 3.3% in low-income countries (4).

Syphilis has often been called "the great imitator" because so many of the signs and symptoms may be difficult to differentiate from those of other diseases (5).

The yearly toll of adverse birth outcomes associated with untreated maternal syphilis is 730,000 to 1,500,000, of which nearly 650,000 deaths occur in fetuses and newborns. Maternal syphilis is less of a concern in developed countries than in developing countries. For example, the sero prevalence of women with syphilis attending antenatal care is estimated to be highest in Latin America (3.90%) and Africa (1.98%), In sub-Saharan Africa, mother-to-child transmission of syphilis is responsible for significant proportion of prenatal mortality count (21%) and associated morbidities e.g. stillbirth and low birth weight (25%), serious neonatal infection (20%) and neonatal death (35%) (6).

In **Brazil**, according to the latest Syphilis Epidemiological Bulletin, from 2005 to june 2022, 535,034 cases of syphilis among pregnant women were notified in the System for Notification of Diseases (SINAN). The southeast region stands out with the highest number of cases corresponding to more than 40% (7).

In Sudan Syphilis testing was offered to all pregnant women attending ANC in the sentinel sites, the 11,889 pregnant women were screened for syphilis using SD Rapid Test where 27 (2.31%) tested positive. We found significant differences in the distribution of syphilis by type of population where the highest prevalence was among the IDPs (6.42%) followed by the Urban (2.11%), Refugees (1.6) and then the Rural (1.53%) populations. There is no any difference between (2.41%) prevalence of

syphilis was estimated for women younger than 25 years compared to 2.31% for 25 years old and above women (8).

Literature Review:

Syphilis is a very old disease involved by many mysteries. From its origins to the reason why even having simple and effective diagnosis and treatment for more than half a century, it remains, in 2021, as a public health problem practically all over the world (9).

Causes of Syphilis: Syphilis is a sexually transmitted infectious (STI) disease caused by the bacterium Treponema pallidum. This bacterium causes infection when it gets into broken skin or mucus membranes, usually of the genital organs. Syphilis is most often transmitted through sexual contact, although it also can be transmitted in other ways (5)

Syphilis is one of the sexually transmitted infections. World Health Organization (WHO) estimates nearly 1.5 million of pregnant women are infected with probable active syphilis each year and approximately, half of the untreated pregnant women suffer adverse outcome during pregnancy (10).

Antenatal screening for syphilis provides a good opportunity to detect the disease early. Those who attended antenatal care but were not offered syphilis testing have been shown to have adverse outcome of the disease (11).

A pregnant woman may pass syphilis to her unborn baby congenital syphilis greatly increases the risk of miscarriage, stillbirth or newborn's death within a few days after birth (12)

The mother can transmit the infection trans placentally to the fetus or during passage through the birth canal by contact of the newborn with a genital lesion. Breast feeding does not result in the transmission of syphilis, unless an infectious lesion is present on the breast (13).

Syphilis in pregnancy is diagnosed in a similar way to the non-pregnant population. Serological tests remain the mainstay for the diagnosis whereby the tests can be divided into two main categories namely non-trampoline tests (i.e. RPR, VDRL) and specific trampoline antibody tests. In our laboratory, we use RPR as our screening laboratory test for syphilis, which is further confirmed by trampoline-based test; syphilis IgM and IgG. Antenatal laboratory test for syphilis plays an important role for the diagnosis, as it is clearly shown that the timing of antenatal care interventions makes a significant difference in the risk of having an adverse outcome due to syphilis (14)

Materials and Methods:

This descriptive cross-sectional and intervention study was conducted in 2019 among 400 pregnant women attending ANC centers in El Nuhood locality, West Kordofan State. Data were collected through structured questionnaires and clinical records. Variables included demographic characteristics, socioeconomic status, knowledge of syphilis, ANC attendance, and laboratory test results. Data analysis was carried out to identify associations between sociolect-demographic factors and syphilis knowledge, as well as clinical outcomes(15,16,17).

Results:

The majority of participants (70%) were aged 15–24 years, 73.3% had secondary or university education, and 99% were married. Most women (85.1%) were housewives or workers, and 87.5% reported a monthly income of less than 2,000 SDG. While ANC attendance was high (99.5%), 97.5% had never undergone periodic syphilis testing. Regarding knowledge, 81.5% were unaware of syphilis, 85.5% did not know about mother-to-child transmission, and 85.8% were unaware of treatment availability. Statistical analysis revealed significant associations between syphilis knowledge and both age (p=0.016) and education level (p=0.000). Premature birth showed a significant association with syphilis positive (p=0.001).

Table 1: Employee of Housewives sampling

Characteristic	Frequency (n=400)	Percentage (%)
Housewives/Workers	340	85
Housewives/ not works	60	15
Total	400	100

Table2: Association between Age and Syphilis Knowledge

Age Group	Knowledge: Yes	Knowledge: No	Total
15–25 years	70 (25.0%)	210 (75.0%)	280
26–35 years	17 (14.2%)	103 (85.8%)	120
Total	87 (21.8%)	313 (78.3%)	400

P value = 0.016 (Significant association).

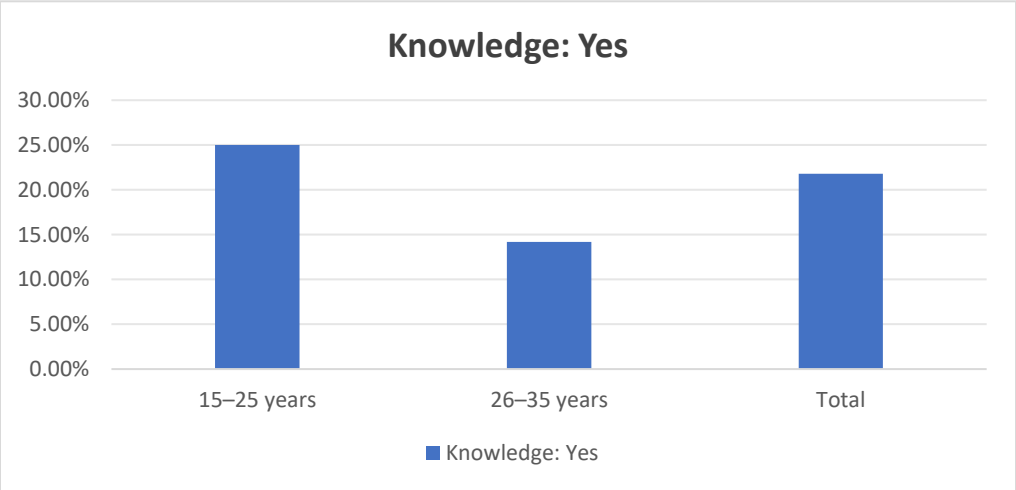


Figure 1: Association between Age and Syphilis Knowledge

Table 3: Association between Education Levels and Syphilis Knowledge

Education Level	Knowledge: Yes	Knowledge: No	Total
Illiterate	2 (3.9%)	49 (96.1%)	51
Literate	1 (2.0%)	50 (98.0%)	51
Primary	1 (20.0%)	4 (80.0%)	5
Secondary	36 (14.9%)	205 (85.1%)	241
University	47 (90.4%)	5 (9.6%)	52
Total	87 (21.8%)	313 (78.3%)	400

P value = 0.000 (Highly significant association).

Table 4: Association between Premature Birth and Syphilis Test Result

Premature Birth	Syphilis Test Result	Total
Yes	35 Negative (94.6%), 2 Positive (5.4%)	37
No	362 Negative (99.7%), 1 Positive (0.3%)	363
Total	397 Negative (99.3%), 3 Positive (0.8%)	400

P value = 0.001 (Significant association).

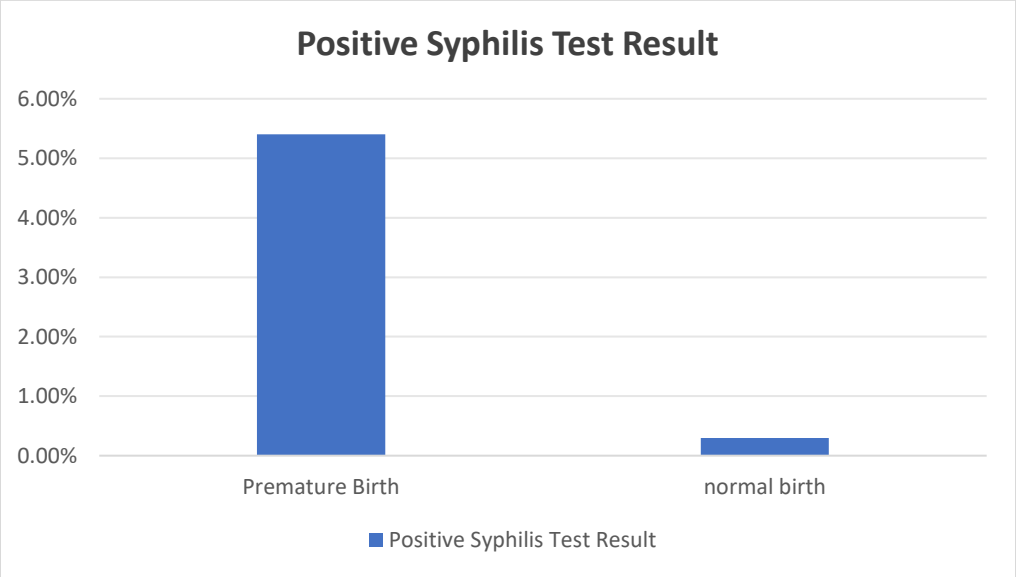


Figure 2 The relationship between syphilis and premature births from sampling

Discussion:

The study highlights a critical gap in awareness regarding syphilis among pregnant women, despite high utilization of ANC services. The findings align with previous studies in sub-Saharan Africa, where low levels of knowledge and limited screening practices have been reported. The strong influence of education on syphilis awareness emphasizes the role of health education in improving maternal and neonatal outcomes. Furthermore, the significant association between premature birth and syphilis positivity underscores the clinical consequences of untreated infections. Barriers such as low income, reliance on public transportation, and lack of routine screening services contribute to the persistence of syphilis transmission.

Conclusion:

This study concludes that there is a severe lack of awareness about syphilis among pregnant women in El Nuhood locality. Despite high ANC attendance, routine syphilis screening remains inadequate. Education was identified as a key determinant of knowledge levels, indicating that awareness campaigns and targeted health education are urgently required. The integration of routine syphilis testing into ANC services is essential to reduce the disease burden and improve maternal and child health outcomes.

Recommendations:

- Strengthening Antenatal Screening: Routine and mandatory syphilis screening should be integrated into antenatal care services for all pregnant women.
- Health Education Programs: Implement continuous community-based health education initiatives to raise awareness about syphilis transmission, prevention, and the importance of early treatment.
- Capacity Building: Train healthcare providers in effective screening, counseling, and management of syphilis cases during pregnancy.
- Policy Development: Health authorities should develop and enforce policies to ensure early diagnosis, treatment, and follow-up of syphilis-infected mothers to prevent adverse pregnancy outcomes.
- Further Research: Conduct larger-scale studies to explore additional social, cultural, and behavioral determinants contributing to syphilis transmission among women of reproductive age.

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