



THE ROLE OF EDUCATIONAL LEVEL IN AWARENESS OF SYPHILIS AND ITS TRANSMISSION ROUTES: A CORRELATIONAL STUDY BETWEEN EDUCATION AND HEALTH KNOWLEDGE IN PREGNANT WOMEN IN AL-NUHOD LOCALITY, SUDAN

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ABSTRACT

This study investigates the relationship between the level of education and syphilis knowledge among pregnant women. This research emphatically highlights the role of educational level as a critical determinant of syphilis knowledge and its transmission routes among pregnant women. A descriptive cross-sectional facility-based study was conducted using total coverage sampling of 400 pregnant women attending antenatal care (ANC) centers in Al Nuhod Town, West Kurdofan State, Sudan, from 2018 to 2021. Data were collected via interview, a structured questionnaire, and laboratory examination for Syphilis. The analysis utilized the Statistical Package for Social Science (SPSS) program.

The overall prevalence of Syphilis was found to be 0.75%. A total of 73.3% of participants had attained a high level of education (secondary or university degree); however, general knowledge about syphilis was still limited, with 78.3% reporting no knowledge of the disease. Study provides conclusive evidence (P -value = 0.000) of a strong, statistically significant correlation between higher educational attainment and greater syphilis knowledge. This confirmation is crucial as the study was conducted in Al-Nuhod, an area previously reported to have the highest syphilis prevalence (6.28%) among pregnant women in Sudan. Knowledge among illiterate participants was notably lower (3.9% reporting "Yes" to syphilis knowledge) compared to those with a university education (27.9% reporting "Yes"). The findings underscore that education plays a major role in reducing syphilis incidence. The study recommends the urgent planning and implementation of effective health education programs to increase awareness of syphilis and its transmission routes within the community.

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

المخلص

تهدف هذه الدراسة الوصفية المقطعية، القائمة على المرافق الصحية، التي تقصي العلاقة بين مستوى التعليم والمعرفة الصحية بمرض الزهري (Syphilis) لدى النساء الحوامل في مدينة النهود، ولاية غرب كردفان، السودان.

وشملت الدراسة تغطية إجمالية لـ 400 امرأة حامل يترددن على مراكز الرعاية ما قبل الولادة (ANC) خلال الفترة الممتدة من عام 2018 إلى عام 2021.

تم جمع البيانات عبر المقابلة الشخصية، واستبيان منظم، التي جانب إجراء الفحص المخبري لمرض الزهري، ولأغراض التحليل الإحصائي، استخدمت حزمة البرامج الإحصائية للعلوم الاجتماعية (SPSS).



أبرز النتائج :

معدل الانتشار: بلغ معدل الانتشار الإجمالي لمرض الزهري بين العينة 0.75 %.

المستوي التعليمي والمعرفة: حصلت نسبة عالية من المشاركات (73.3 %) علي مستوي تعليمي عال (شهادة ثانوية او جامعة). ومع ذلك ظلت المعرفة بمرض الزهري محدودة للغاية, حيث افادة نسبة كبيرة بلغت 78.3% بعدم امتلاكهن اي معرفة بالمرض.

الارتباط: تم الكشف عن ارتباط إحصائي دال بين مستوي التعليم للمشاركات ومعرفتهن بمرض الزهري (P-value =0.000) تأتي اهمية هذا التاكيد من كون محلية النهود قد سجلت اعلي معدل انتشار لزهري بين الحوامل في السودان (6.28%) في تقارير سابقة.

التاثير: كانت المعرفة الصحية لدي المشاركات الأميات اقل بشكل ملحوظ (3.9% فقط أجبن بالإيجاب) مقارنة بالمشاركات الحاصلات علي تعليم جامعي (27.9% أجبن بالإيجاب).

الاستنتاج والتوصيات:

تؤكد هذه النتائج أن المستوي التعليمي يلعب دورا محوريا في تشكيل الوعي والمعرفة الصحية , مما يسهم بشكل غير مباشر في الحد من الإصابة بمرض الزهري. بناء علي ذلك توصي الدراسة بالتخطيط والتنفيذ الفوري والفعال لبرامج التثقيف الصحي المتخصصة لرفع مستوي الوعي المجتمعي بمرض الزهري وطرق انتقاله, ودمجها ضمن خدمات الرعاية الاولية والرعاية ما قبل الولادة.

الكلمات المفتاحية

الزهري، رعاية ما قبل الولادة، النساء الحوامل، علم الأوبئة، صحة الأم، السودان

INTRODUCTION

Background

Syphilis, caused by the bacterium *Treponema pallidum*, remains a critical global public health concern, particularly in developing countries(1), contributing to severe adverse outcomes such as stillbirth and congenital syphilis in nearly 650,000 fetuses and newborns annually(2)(3)(4).

In Sudan, a syphilis prevalence of 2.31% was reported among pregnant women attending ANC in sentinel sites(5), with the study's specific setting, Al-Nuhod locality, previously reporting the highest prevalence in the country (6.28%)(6). While general poor health knowledge and inadequate antenatal follow-up have been identified as key associated factors, a detailed, quantitative understanding of how a woman's formal educational level specifically correlates with her knowledge of Syphilis, its risks, and transmission routes in this high-risk population is critically lacking. This absence of localized, evidence-based data on the education-knowledge pathway constitutes a significant gap that prevents the design and implementation of effectively targeted public health interventions.

Problem Statement

Syphilis continues to pose a profound and unmitigated risk to maternal and fetal health in Al-Nuhod locality. Understanding the specific relationship between a woman's educational background and her knowledge of Syphilis, its risks, and transmission routes is essential.(7) Therefore, the lack of defined data on this correlation hinders the ability of health authorities to design targeted public health interventions that address the educational and awareness deficits necessary to mitigate this high-risk scenario.



Objective

The objective of this study is to determine the role of educational level in awareness of syphilis and its transmission routes by assessing the correlation between a woman's educational level and her syphilis knowledge among pregnant women attending antenatal clinics (ANC) in Al-Nuhod locality.

Research Questions

This study seeks to answer the following questions:

- * What is the current level of syphilis knowledge and awareness regarding its transmission routes among pregnant women attending ANC centers in Al-Nuhod locality?
- * What is the distribution of educational levels among the study population of pregnant women in Al-Nuhod locality?
- * Is there a statistically significant correlation between the educational level of pregnant women and their knowledge of syphilis in Al-Nuhod locality?

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 (8).

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 (9)

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)

METHODOLOGY

Study Design and Setting

This was a descriptive cross-sectional, facility-based study. It was conducted in the antenatal care (ANC) centers of Al Nuhod Town, West Kurdofan State, Sudan, covering the epidemiological period from 2018 to 2021.

Study Population and Sample

The study population included all available pregnant women attending the ANC centers during the sample collection period (February 1, 2021, to March 10, 2021). A total of 400 pregnant women were included in the study.



Data Collection and Analysis

Data were collected through interviews using a designed questionnaire, which covered socio-demographic factors (including education), knowledge, attitudes, and practices (KAP) related to syphilis. A laboratory examination for Syphilis was also conducted. Data were analyzed using the Statistical Package for Social Science (SPSS) program, and P-values were calculated to determine statistical significance. A P-value of 0.000 was determined to show a strong association for the primary variables studied.

RESULTS

Distribution of Educational Level

The majority of the participants demonstrated a high level of educational attainment:

- * 73.3% of the participants had attained a high level of education.
- * 60.3% completed secondary school.
- * 13.0% had a university degree.

Syphilis Knowledge and Awareness

Of the total 400 participants, a minority reported having knowledge of syphilis:

- * Only 21.8% of the women reported having syphilis knowledge ("Yes").
- * 78.3% reported having no knowledge of syphilis ("No").

Association between Education and Syphilis Knowledge

A statistically significant association was observed when correlating educational level with syphilis knowledge.

Education levels	syphilis Knowledge		Total	P value
	Yes	No		
Illiterate	2	49	51	0.000
	(3.9%)	(96.1%)	(100%)	
literate	1	50	51	0.000
	(2.0%)	(98.0%)	(100%)	
Primary	1	4	5	0.000
	(20.0%)	(80.0%)	(100%)	
Secondary	36	205	241	0.000
	(14.9%)	(85.1%)	(100%)	
University	47	5	52	0.000
	(90.4%)	(9.6%)	(100%)	
Total	87	313	400	0.000
	(21.8%)	(78.3%)	(100%)	

- * There is a highly significant association between Education levels and syphilis Knowledge at P-value = 0.000.
- * The lowest percentage of women with syphilis knowledge was found among the illiterate group at 3.9%.
- * Conversely, syphilis knowledge was highest among women with a secondary education (14.9%) and a university degree (90.4%).

DISCUSSION

The current study is supported by a recent regional finding that validates its core conclusion regarding the vulnerability of less-educated groups:

Ethiopia Study (2022): This research confirmed that women with no formal education had a significantly higher likelihood of Syphilis infection (AOR=3.6) compared to those with formal education.(15) This result strongly supports the finding in Al-Nuhod that illiterate individuals represent the most vulnerable group with the lowest knowledge (3.9% knowledge).

The study confirmed the hypothesis that a woman’s level of formal education is a critical determinant of her health knowledge regarding syphilis. The presence of a highly significant association (p=0.000) between educational level and syphilis knowledge suggests that education and awareness play a major role in reducing syphilis incidence. These



findings disagree with a study conducted in Uganda (Simiyu A. et al., 2019), in which about 27% of participants had completed only primary education.(16)

The observed gap in awareness is striking: while over 73% of participants had a high school or university education, the overall reported knowledge of syphilis was only 21.8%. This indicates that even with higher education, specific health education programs are still necessary. However, the data strongly suggest that education acts as a protective factor, with knowledge rates among those with secondary and university education being significantly higher than the 3.9% knowledge rate observed in the illiterate group. This group, particularly those with no formal education, represents a key vulnerability for potential infection due to limited awareness of the disease, its risks, and routes of mother-to-child transmission.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study conclusively demonstrated a strong and significant positive correlation between the level of education and syphilis knowledge among pregnant women in Al-Nuhod locality (P-value = 0.000). The findings highlight that knowledge, attitudes, and practices (KAP) toward syphilis still require continuous improvement, particularly in the most vulnerable groups. Enhancing health education is crucial for increasing the awareness needed to limit disease spread and reduce the risk of congenital syphilis.

Recommendations

* Develop Targeted Health Education Programs: Planning and implementation of effective, accessible, and continuous health education programs are essential to increase community awareness about syphilis, its transmission routes, and prevention methods, with a special focus on low-literacy populations.

* Encourage Antenatal Care (ANC) Adherence: Strengthen efforts to encourage pregnant women to adhere to regular ANC visits and routine syphilis screening, as this is vital for early detection and reduction of complications.

* Community Engagement: Engage civil society organizations, community, and religious leaders in disseminating health messages to promote early screening and discourage high-risk behaviors.

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