

Examining health literacy and knowledge among U.S. women: Insights from a national survey

Elena Ghezzi¹, Boyun Kim MA², Kyeorda Kemp PhD¹, Deidre Hurse PhD¹

¹Oakland University William Beaumont School of Medicine (OUWB), Rochester, MI, USA
²Department of Human Development and Child Studies, Oakland University, Rochester, MI, USA

Introduction

- Between 2015-2019, the CDC reported an almost 3-fold increase in syphilis cases among women in the US.¹ Congenital syphilis (CS) cases have tripled between 2016 and 2020.¹ The resurgence of syphilis, particularly in women, and the increase in CS represent a significant public health crisis.
- Certain marginalized groups experience a disproportionate impact of syphilis. Systemic inequities such as structural racism, underfunded healthcare systems, and economic disadvantage contribute to disproportionately high rates of syphilis among Black women and non-Hispanic American Indian or Alaska Native women.²
- Health literacy (HL), the capacity to obtain, comprehend, and use health-related information effectively, is essential for reducing the transmission of sexually transmitted infections (STIs) and understanding treatment and prevention^{3, 4}
- Despite the well-documented resurgence in syphilis rates, limited research has examined how health literacy influences syphilis knowledge (SK) and prevention, particularly among women of reproductive age

Aims and Objectives

Primary Goal:

- To assess syphilis knowledge and health literacy among U.S. women aged 18-49

Specific Aims:

- Evaluate the correlation between health literacy and syphilis knowledge.
- Identify demographic factors (education, health literacy) that influence syphilis knowledge and health literacy

- Survey Sample Methods** 643 U.S. women aged 18-49 via the Centiment distribution software (November 2023).

Health Literacy (HL):

- Measured using The Chew et al. (2004) Health Literacy Screening Tool includes three items, scoring individuals from 3 to 15 points.⁵ A score of 9 or lower indicates inadequate health literacy.

Syphilis Knowledge (SK):

- Measured using an 8-item validated scale; a score of 6 or higher indicates adequate knowledge of syphilis.⁶

Statistical Analysis:

- Logistic Regression was used to analyze the association between HL with SK scores.
- Regression models included age, race/ethnicity, and highest education level to determine if these factors influenced the relationship between HL and SK
- Analysis was performed using SPSS Version 29.0.2.0.

Results

Table 1: Summary of SK and HL results

Health Literacy Score	With Syphilis Knowledge N(%)	Without Syphilis Knowledge N(%)	Total N
Inadequate HL N (%)	87 (72.5%)	33 (27.5%)	120
Not Inadequate HL N (%)	466 (89.1%)	57 (10.9%)	523
Total N (%)	553 (86.0%)	90 (14.0%)	643

Note. Values are n (percentage of total sample, N = 643). Percentages may not sum to exactly 100 % due to rounding.

Table 2: Summary of demographics and scores

Demographic	Frequency (n)	Percent (%)
Age		
18-24	123	19.0%
25-34	221	34.0%
35-44	175	27.0%
45-49	124	19.0%
Highest Level of Education		
Some High School	37	6.0%
High School	325	51.0%
Trade School	60	9.0%
Bachelor's Degree	121	19.0%
Master's Degree	33	5.0%
Ph.D. or higher	10	2.0%
Other	57	9.0%
Ethnicity		
African American or Black	79	12.3%
Asian	21	3.3%
Caucasian or White	441	68.7%
Indigenous or Native American	8	1.2%
Latina or Hispanic	48	7.5%
Native Hawaiian or Pacific Islander	3	0.5%
Middle Eastern or North African	1	0.2%
More than 1 Ethnicity	42	6.5%

Note. Values are presented as n (percentage of total sample, N = 643). Race/ethnicity was self-reported; participants selected a single category. Percentages may not sum to exactly 100 % due to rounding.

Note. Age was self-reported and then grouped into four bands (18–24, 25–34, 35–44, 45–54 years). Values are presented as n (percentage of total sample, N = 643). Percentages may not sum to exactly 100 % due to rounding.

Note. Education level was self-reported and grouped as shown. Values are n (percentage of total sample, N = 643). Percentages may not sum to exactly 100 % due to rounding

Table 3: Associations with Health Literacy

	χ ² (df)	P-Value
Syphilis Knowledge	22.35 (1)	<.0001 ¹
Race	39.24 (6)	<.0001 ¹
Highest Level of Education	3.80 (7)	0.8020 ¹
Age	41.32 (3)	<.0001 ¹

¹Chi-square tests were used to assess associations between health literacy and each categorical variable; degrees of freedom are shown in parentheses.

Conclusions

- This study explored the relationship between HL and SK, finding a strong and statistically significant association (p < 0.001).
- The relationship between age, race/ethnicity, syphilis knowledge, and health literacy was statistically significant in the multivariable model (p < 0.001)
- The proportion of individuals demonstrating adequate HL increased with age, suggesting that younger populations may particularly benefit from initiatives designed to strengthen health literacy capacities and syphilis knowledge
- The study was limited by the overrepresentation of Caucasian or White participants and Michigan residents, limiting the generalizability of findings
- By integrating health literacy into syphilis prevention efforts, public health initiatives can more effectively address persistent disparities and improve maternal and child health outcomes.

References

- Centers for disease control and prevention. (2021). Sexually Transmitted Disease Surveillance 2021. U.S. Department of Health and Human Services Atlanta.
- Rankin E, Forrest A, Maharjan L, et al. Epidemiological analysis of syphilis trends, disparities, and public health implications in the United States, 2018–2022. BMC Infect Dis. 2025;25:1106. 10.1186/s12879-025-11332-4.
- Baker DW. The meaning and the measure of health literacy. J Gen Intern Med. 2006;21(8):878–83
- Kilfoyle KA, Vitko M, O'Connor R, Bailey SC. Health literacy and women's reproductive health: a systematic review. J Womens Health (Larchmt). 2016;25(12):1237–55.
- Chew LD, Bradley KA, Boyko EJ. Brief questions to identify patients with inadequate health literacy. Fam Med. 2004;36(8):588–94.
- Wu X, Hong F, Lan L, Zhang C, Feng T, Yang Y. Poor awareness of syphilis prevention and treatment knowledge among six different populations in South China. BMC Public Health. 2016;16:287

Acknowledgements

This study was made possible by contributions from the Michigan Health Endowment Fund.

The authors also recognize the support of Dr. Linda Dillon and Dr. Ramin Homayouni in contributing to this research.