

Multilevel Socioeconomic and Regional Disparities in Maternal Healthcare Access in a High-Burden Setting

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BACKGROUND

- Despite progress, millions of women still face obstacles before can receive the care they need.

THE GLOBAL BURDEN



- An estimated **287,000** women die from preventable causes related to pregnancy and childbirth each year.¹
- 94%** of these deaths occur in low- and middle-income countries.¹
- Maternal mortality has declined by only **34%** globally since 2000—far from the 2030 SDG target.²

- Existing evidence on barriers to maternal healthcare access in Nigeria remains fragmented across populations, settings, and dimensions of care.
- Limited nationally representative studies have examined how individual, household, and community-level factors simultaneously shape healthcare access barriers.
- A comprehensive understanding of multilevel socioeconomic and regional disparities is essential for designing equitable and effective maternal health interventions.

OBJECTIVES

- To examine the prevalence and multilevel determinants of barriers to maternal healthcare access among women of reproductive age.
- To assess how socioeconomic and regional disparities shape healthcare access inequities in a high-burden setting.

METHODS

1 STUDY DESIGN Cross-sectional analysis of nationally representative population-based survey data.

2 DATA SOURCE 2018 Demographic and Health Survey (DHS)-Nigeria

3 STUDY POPULATION 41,821 women 15-49 Years of age

4 OUTCOME MEASURE Reported ≥ 1 barriers to maternal healthcare access:
• Financial constraints
• Distance to facility
• Need for permission
• Inability to travel alone

5 EXPLANATORY VARIABLES
• Socioeconomic characteristics
• Reproductive factors
• Media exposure
• Health insurance coverage
• Residence and regional factors

6 STATISTICAL ANALYSIS
• Weighted descriptive analyses
• Chi-square tests
• Multilevel mixed-effects logistic regression
• Adjusted Odds Ratios (aORs) with 95% Confidence Intervals (CIs)

Stata version 18.0

METHODS CONT'D

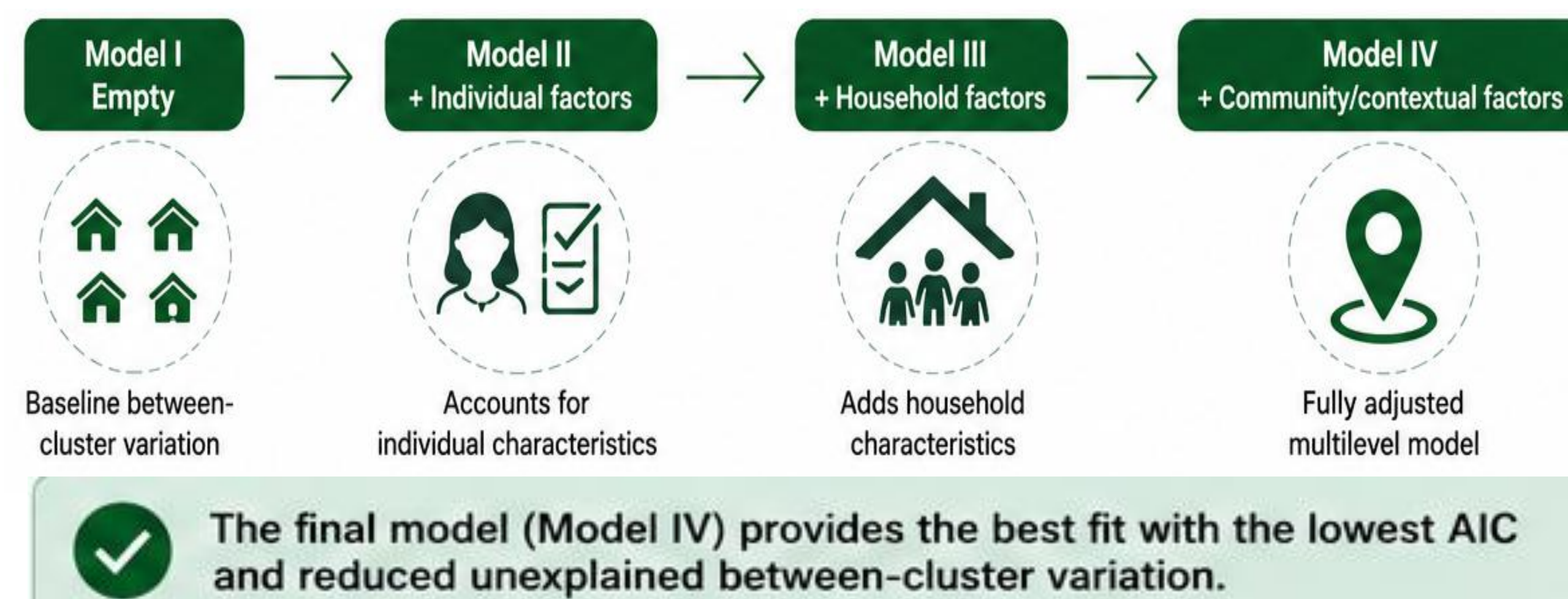


Figure 1: Model Building Strategy for Multilevel Mixed-Effects

RESULTS

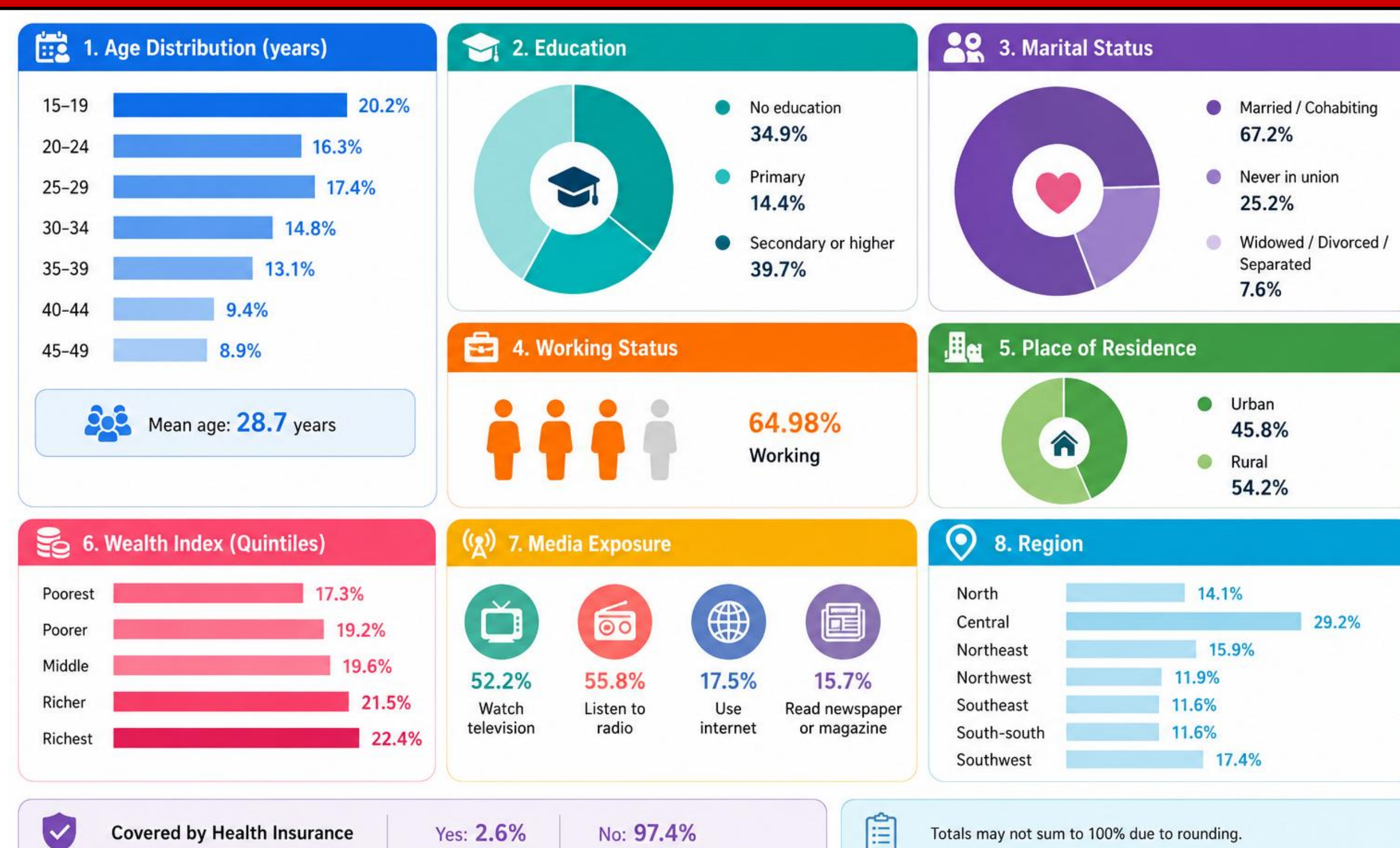


Figure 2: Table 1: Sociodemographic Characteristics of Women of Reproductive Age (N = 41,821)

Table 1: Sociodemographic Characteristics of Women of Reproductive Age in a High-Burden Setting (N = 41,821)

Characteristic	Healthcare Access Barrier Status		Test Statistics	
	Have Access Barrier	Do not Have Access Barrier	X ² value	p-value
	Weighted % [95% CI]	Weighted % [95% CI]		
Overall	51.5 [50.3, 52.8]	48.5 [47.2, 49.7]	5.79	0.016*
Woman's age (years)			17.94	0.008**
15-19	52.4 [50.5, 54.2]	47.6 [45.8, 49.5]		
20-24	51.3 [49.3, 53.2]	48.7 [46.8, 50.7]		
25-29	50.3 [48.6, 52.0]	49.7 [48.0, 51.4]		
30-34	50.3 [47.6, 51.9]	49.7 [48.1, 52.4]		
35-39	50.9 [48.9, 52.9]	49.1 [47.1, 51.1]		
40-44	52.0 [50.0, 54.0]	48.0 [46.0, 50.0]		
45-49	54.9 [52.8, 57.1]	45.1 [42.9, 47.2]		
Educational attainment			617.85	<0.001***
No education	62.6 [60.8, 64.4]	37.4 [35.6, 39.2]		
Primary	54.9 [52.9, 56.9]	45.1 [43.1, 47.1]		
Secondary	46.5 [44.9, 48.1]	53.5 [51.9, 55.1]		
Higher	30.1 [27.8, 32.5]	69.9 [67.5, 72.2]		
Marital status			55.13	<0.001***
Never in union	48.7 [46.8, 50.5]	51.3 [49.5, 53.2]		
Married	51.7 [50.4, 53.1]	48.3 [46.9, 49.6]		
Cohabiting	53.8 [49.0, 58.5]	46.2 [41.5, 51.0]		
Widowed	64.9 [61.2, 68.4]	35.1 [31.6, 38.8]		
Divorced	58.5 [52.9, 63.9]	41.5 [36.1, 47.1]		
Separated	57.5 [52.9, 62.1]	42.5 [37.9, 47.1]		
Religion			15.20	0.382
Christians	52.1 [50.5, 53.8]	47.9 [46.2, 49.5]		
Muslims	51.0 [49.2, 52.9]	49.0 [47.1, 50.8]		
Traditional/Others	47.1 [40.2, 54.2]	52.9 [45.8, 59.8]		
Current working status			0.02	0.894
Not working	51.4 [49.5, 53.3]	48.6 [46.7, 50.5]		
Working	51.6 [50.3, 52.9]	48.4 [47.1, 49.7]		
Parity			89.38	<0.001***
Zero	48.5 [46.7, 50.2]	51.5 [49.8, 53.3]		
One	48.9 [46.8, 51.0]	51.1 [49.0, 53.2]		
Two	50.6 [48.4, 52.7]	49.4 [47.3, 51.6]		
Three	49.8 [47.7, 51.8]	50.2 [48.2, 52.3]		
Four or more	55.4 [53.9, 56.9]	44.6 [43.1, 46.1]		
Covered by health insurance			201.25	<0.001***
No	52.4 [51.2, 53.6]	47.6 [46.4, 48.8]		
Yes	18.7 [15.2, 22.8]	81.3 [77.2, 84.8]		
Read newspaper or magazine			540.14	<0.001***
No	54.9 [53.7, 56.2]	45.1 [43.8, 46.3]		
Yes	33.3 [31.5, 35.3]	66.7 [64.7, 68.5]		

RESULTS CONT'D

Table 1 Continued

	Weighted % [95% CI]	Weighted % [95% CI]	X ² value	p-value
Listen to radio			196.32	<0.001***
No	59.1 [57.4, 60.8]	40.9 [39.2, 42.6]		
Yes	45.5 [44.1, 47.0]	54.5 [53.0, 55.9]		
Watch television			254.31	<0.001***
No	60.9 [59.3, 62.5]	39.1 [37.5, 40.7]		
Yes	42.9 [41.3, 44.6]	57.1 [55.4, 58.7]		
Use Internet			461.65	<0.001***
No	55.4 [54.2, 56.7]	44.6 [43.3, 45.8]		
Yes	33.0 [31.0, 35.0]	67.0 [65.0, 69.0]		
Sex of household head			0.14	0.705
Male	51.4 [50.1, 52.8]	48.6 [47.2, 49.9]		
Female	51.9 [49.7, 54.0]	48.1 [46.0, 50.3]		
Wealth index			642.34	<0.001***
Poorest	69.8 [67.4, 72.2]	30.2 [27.8, 32.6]		
Poorer	61.6 [59.3, 63.9]	38.4 [36.1, 40.7]		
Middle	53.8 [51.8, 55.8]	46.2 [44.2, 48.2]		
Richer	44.8 [42.5, 47.2]	55.2 [52.8, 57.5]		
Richest	33.1 [30.9, 35.4]	66.9 [64.6, 69.1]		
Place of residence			166.47	<0.001***
Urban	42.1 [40.1, 44.1]	57.9 [55.9, 59.9]		
Rural	59.5 [57.9, 61.1]	40.5 [38.9, 42.1]		
Region			246.40	<0.001***
North Central	58.7 [55.8, 61.5]	41.3 [38.5, 44.2]		
Northeast	68.6 [65.3, 71.7]	31.4 [28.3, 34.7]		
Northwest	44.6 [42.0, 47.3]	55.4 [52.7, 58.0]		
Southeast	55.9 [52.4, 59.3]	44.1 [40.7, 47.6]		
South-South	54.1 [51.3, 56.8]	45.9 [43.2, 48.7]		
Southwest	37.0 [33.5, 40.7]	63.0 [59.3, 66.5]		

Footnote: Significance Level: *p<0.05; **p<0.01; ***p<0.001.

Table 2: Bivariable Analysis of Barriers to Maternal Healthcare Access Among Women in a High-Burden Setting

Characteristic	Model I Empty model	Model II aOR [95% CI]	Model III aOR [95% CI]	Model IV aOR [95% CI]
Fixed effect results				
Woman's age (years)				
15-19 (Ref)		1.00		1.00
20-24		1.00 [0.89, 1.13]		0.99 [0.87, 1.12]
25-29		0.96 [0.85, 1.08]		0.95 [0.84, 1.07]
30-34		0.98 [0.86, 1.12]		0.98 [0.86, 1.12]
35-39		0.94 [0.82, 1.09]		0.94 [0.82, 1.08]
40-44		0.90 [0.77, 1.05]		0.91 [0.78, 1.07]
45-49		0.92 [0.79, 1.07]		0.93 [0.79, 1.08]
Educational attainment				
No education (Ref)		1.00		1.00
Primary		0.80*** [0.72, 0.90]		0.82*** [0.73, 0.92]
Secondary		0.68*** [0.60, 0.76]		0.75*** [0.66, 0.84]
Higher		0.51*** [0.43, 0.59]		0.60*** [0.51, 0.71]
Marital status				
Never in union (Ref)		1.00		1.00
Married		0.61*** [0.54, 0.70]		0.66*** [0.58, 0.75]
Cohabiting		0.92 [0.72, 1.18]		0.94 [0.73, 1.21]
Widowed		1.16 [0.94, 1.44]		1.17 [0.94, 1.46]
Divorced		1.26 [0.99, 1.61]		1.28 [1.01, 1.64]
Separated		1.13 [0.86, 1.48]		1.09 [0.83, 1.44]
Parity				
Zero (Ref)		1.00		1.00
One		1.10 [0.95, 1.27]		1.06 [0.92, 1.23]
Two		1.27*** [1.09, 1.46]		1.22*** [1.06, 1.42]
Three		1.22*** [1.04, 1.42]		1.18*** [1.01, 1.38]
Four or more		1.34*** [1.15, 1.56]		1.29*** [1.10, 1.50]
Covered by health insurance				
No (Ref)		1.00		1.00
Yes		0.43*** [0.32, 0.59]		0.46*** [0.34, 0.62]
Read newspaper or magazine				
No (Ref)		1.00		1.00
Yes		0.70*** [0.62, 0.78]		0.70*** [0.62, 0.78]
Listen to radio				
No (Ref)		1.00		1.00
Yes		0.86*** [0.77, 0.97]		0.88*** [0.78, 1.00]
Watch television				
No (Ref)		1.00		1.00
Yes		0.67*** [0.60, 0.76]		0.75*** [0.66, 0.86]
Use Internet				
No (Ref)		1.00		1.00
Yes		0.74*** [0.66, 0.84]		0.80*** [0.71, 0.91]
Wealth index				
Poorest (Ref)		1.00		1.00
Poorer		0.79*** [0.69, 0.90]		0.84*** [0.74, 0.96]
Middle		0.52*** [0.44, 0.60]		0.62*** [0.52, 0.72]
Richer		0.32*** [0.27, 0.37]		0.44*** [0.37, 0.53]
Richest		0.18*** [0.15, 0.22]		0.32*** [0.26, 0.39]
Place of residence				
Urban (Ref)		1.00		1.00
Rural		1.38*** [1.18, 1.62]		1.29*** [1.09, 1.51]
Region				
North Central (Ref)		1.00		1.00
Northeast		1.79*** [1.39, 2.31]		1.59*** [1.23, 2.05]
Northwest		0.45*** [0.36, 0.57]		0.39*** [0.31, 0.50]
Southeast		1.69*** [1.32, 2.17]		1.85*** [1.44, 2.38]
South-South		1.35*** [1.07, 1.70]		1.49*** [1.18, 1.88]
Southwest		0.61*** [0.47, 0.80]		0.65*** [0.49, 0.86]

aOR = adjusted odds ratios; CI = Confidence Interval; Ref = Reference category; PSU = Primary Sampling Unit; ICC = Intra-Class Correlation Coefficient; AIC = Akaike Information Criterion; Significance Level: *p<0.05; **p<0.01; ***p<0.001.

RESULTS CONT'D

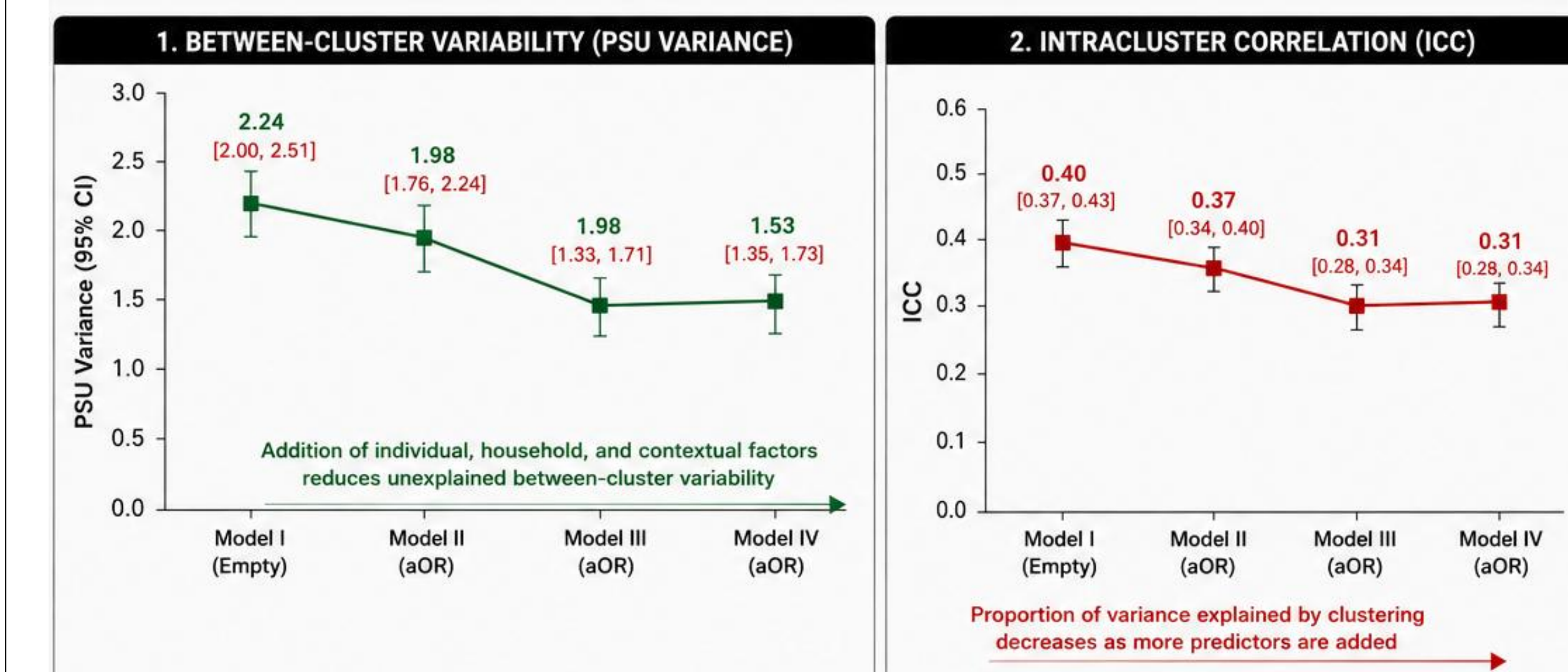


Figure 3: Random Effect Model

Table 3: Model Comparison and Fit Statistics for Random Effect Model

Characteristic	Model I Empty model	Model II aOR [95% CI]	Model III aOR [95% CI]	Model IV aOR [95% CI]
Wald chi-square	Reference	710.69***	835.74***	1218.03***
Model fitness				
Log-likelihood	-24125.248	-23431.881	-23575.69	-23157.183
AIC	48254.5	6913.76	47175.38	46384.37
N	41,821	41,821	41,821	41,821
Number of clusters	1,389	1,389	1,389	1,389

IMPLICATIONS

- Barriers to maternal healthcare access remain strongly patterned by socioeconomic disadvantage, with poorer, less educated, and rural women experiencing disproportionately higher odds of access constraints.
- Significant between-community variability observed across multilevel models highlights the important influence of contextual and regional factors on maternal healthcare access.
- The reduction in unexplained cluster-level variation across sequential models suggests that individual, household, and community-level characteristics collectively contribute to healthcare access inequities.

CONCLUSION

- Substantial multilevel socioeconomic and regional disparities in maternal healthcare access persist in this high-burden setting, underscoring the need for equity-focused interventions.
- Strengthening financial protection, improving healthcare accessibility, and addressing contextual barriers are critical to advancing equitable maternal health outcomes.

References: SCAN

For the full list of References

