

Prenatal Education Needs and Preferences by Educational Attainment Among Pregnant Patients: A Prospective, Cross-sectional Observational Study

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Abstract

Background

Prenatal education is an important component of antenatal care that can address knowledge gaps, reduce fear and anxiety associated with childbirth, and support informed decision-making. However, standardized approaches may not meet the diverse informational needs of pregnant patients.

Methods

We conducted a prospective, cross-sectional survey of pregnant patients receiving care from October 2024 to December 2025. Eligible participants were ≥ 32 weeks' gestation, ≥ 19 years old, and English- or Spanish-speaking. A 24-item survey assessed preferred educational formats, topics of interest, timing of education, perceived counseling gaps, and prior childbirth experience. Demographic and obstetric characteristics were collected.

Results

Among 198 participants, 84 (42.4%) had a high school education or less, and 114 (57.6%) had a college education or higher. Patients with lower educational attainment were more likely to have Medicaid insurance, higher gravidity and parity, prior cesarean delivery, social work involvement, and missed prenatal visits (all $p < 0.05$). Racial and ethnic composition differed significantly between groups ($p < 0.0001$). Interest in additional prenatal education was similar regardless of education level (48.2% vs 48.7%, $p = 0.9$). However, educational preferences differed by group: among patients with previous childbirth experience, those with lower educational attainment more frequently reported wanting additional information on normal pregnancy changes ($p = 0.03$) and labor induction ($p = 0.001$), even after adjustment for covariates. Preferred educational formats did not differ by education level ($p = 0.9$).

Conclusions

Interest in prenatal education is high across educational backgrounds, but informational priorities vary by educational attainment. Individualizing prenatal counseling content while maintaining accessible educational delivery

Background

Prenatal education is a critical component of comprehensive antenatal care, providing patients with information needed to make informed decisions regarding their pregnancy, delivery, and postpartum recovery [1]. It is recommended that every pregnant patient receive education and counseling as a routine component of antenatal care [1]. Prior studies have demonstrated that effective prenatal

education reduces childbirth-related fear and anxiety, enhances self-efficacy, and increases preferences for and occurrences of vaginal birth [2-4].

Despite these benefits, prenatal education is often delivered in a standardized, “one-size-fits-all” format that may not account for variations in patient backgrounds, health literacy, prior obstetric experiences, or individual knowledge gaps [5-7]. Differences in socioeconomic factors and educational attainment may influence how patients access health information, navigate healthcare systems, and engage with clinical care [5-7].

While pregnant patients have reported information needs spanning labor and delivery, medications, and newborn care, systematic reviews highlight consistent gaps between desired and received information [5-6]. Frequently reported information needs include fetal development and safety, nutrition and lifestyle, labor and delivery, medication safety, vaccination, laboratory testing, mental health, and newborn care [5]. Understanding these differences may allow providers to better individualize counseling and improve patient-centered care. However, limited data exist regarding how educational attainment influences desired prenatal education topics, formats, and perceived gaps in counseling.

Our study sought to evaluate differences in prenatal education needs and preferences among pregnant patients based on educational attainment. We hypothesized that patients’ educational background would correlate with specific topic preferences and perceived counseling needs.

Methods

We conducted an Institutional Review Board approved (IRB #0249-24-EP) prospective cross-sectional survey of pregnant patients receiving prenatal care at a tertiary care center from October 2024 to December 2025.

Eligible participants were ≥ 19 years of age, ≥ 32 weeks’ gestation at the time of survey completion, and able to complete the survey in English or Spanish. Patients unable to provide informed consent or whose data were unavailable were excluded (Figure 1). Participants were recruited during routine prenatal visits and visits to the Prenatal Diagnostic Center (PDC) for ultrasound and non-stress test appointments. Participants’ prenatal care providers included certified nurse midwives, general obstetricians, and Maternal-Fetal Medicine faculty.

Participants completed a 24-item survey developed to assess prenatal education preferences and experiences. Survey domains included preferred educational formats, topics of interest, timing and frequency of prenatal education, perceived gaps in counseling, and prior childbirth experience. Participants could select multiple educational topics and formats; therefore, response categories were not mutually exclusive and percentages may not sum to 100%. Demographic and obstetric characteristics were collected from participant self-report and the electronic medical record, including race and ethnicity, insurance status, gravidity, parity, gestational age at survey, prior cesarean delivery, maternal medical comorbidities, tobacco and substance use, and social work involvement. Delivery and

postpartum variables included gestational age at delivery, labor pain management methods, maternal and neonatal complications, neonatal Apgar scores, hospital length of stay, hospital readmission, postpartum contraceptive plan, and timing of postpartum follow-up.

Participants were categorized by educational attainment into two groups: high school education or less and college education or higher. Descriptive statistics summarized demographic, obstetric, and survey characteristics. Continuous variables were compared using Student's t-test or appropriate nonparametric tests, and categorical variables were compared using chi-square or Fisher's exact tests as appropriate. Associations between educational attainment and prenatal education preferences were evaluated. A two-sided p-value <0.05 was considered statistically significant. Multivariable logistic regression models were used to evaluate the association between educational attainment and overall interest in additional prenatal education, topics of interest, and preference for provider/in-person education, adjusting for race, insurance status, language, and parity.

Results

A total of 198 pregnant patients completed the survey. Of these, 84 (42.4%) had a high school education or less, and 114 (57.6%) had a college education or higher. Compared with patients with a college education or higher, those with a high school education or less were more likely to have Medicaid insurance (61.9% vs. 16.7%, $p<0.0001$), higher gravidity (median 3 [IQR 2–5] vs. 2 [IQR 1–3], $p<0.0001$) and parity (median 1 [IQR 0–3] vs. 1 [IQR 0–1], $p=0.0001$), prior cesarean delivery (32.1% vs. 14.0%, $p=0.002$), social work involvement (62.2% vs. 25.2%, $p<0.0001$), and missed prenatal visits (20.7% vs. 8.0%, $p=0.01$). Lower educational attainment was also associated with differences in race and ethnicity ($p<0.0001$), English-speaking status (89.3% vs. 97.4%, $p=0.03$), tobacco use ($p=0.02$), and transportation barriers (9.5% vs. 1.8%, $p=0.02$). Provider type, drug use, medical comorbidities, gestational age at survey did not differ significantly between groups ($p>0.05$ for all) (Table 1).

Characteristic	HS or Less (n = 84)	College or More (n =114)	P value
Gestational age at survey, mean $\pm$ SD	35.2 $\pm$ 2.2	35.3 $\pm$ 2.2	0.8
English-speaking, n (%)	75 (89.3)	112 (97.4)	0.03
Race/ethnicity, n (%)			<0.0001
White/Caucasian	27 (32.1)	82 (71.9)	
African American	24 (28.6)	8 (7.0)	
Hispanic/Latina	28 (33.3)	17 (14.9)	
Asian	2 (2.4)	6 (5.3)	
Native American	1 (1.2)	0 (0.0)	
Other	2 (2.4)	1 (0.9)	
Insurance type, n (%)			<0.0001
Medicaid	52 (61.9)	19 (16.7)	
Private	24 (28.6)	86 (75.4)	
Gravidity, median (IQR)	3 (2–5)	2 (1–3)	<0.0001
Parity, median (IQR)	1 (0–3)	1 (0–1)	0.0001
Prior cesarean delivery, n (%)	27 (32.1)	16 (14.0)	0.002
Provider type, n (%)			0.7
Resident clinic	19 (23.2)	31 (27.2)	
Generalist	2 (2.4)	3 (2.6)	
Certified nurse-midwife	42 (51.2)	61 (53.5)	
Maternal-fetal medicine	19 (23.2)	19 (16.7)	
Tobacco use, n (%)			0.02
Current	4 (4.8)	3 (2.6)	
Former	16 (19.1)	8 (7.0)	
None	64 (76.2)	103 (90.4)	
Drug use, n (%)	3 (3.6)	1 (0.9)	0.3
Social work consult, n (%)	51 (62.2)	28 (25.2)	<0.0001
Missed prenatal visits, n (%)	17 (20.7)	9 (8.0)	0.01

Transportation barriers, n (%)	8 (9.5)	2 (1.8)	0.02
Cost barriers, n (%)	3 (3.6)	4 (3.5)	1.00
Childcare barriers, n (%)	6 (7.1)	2 (1.8)	0.07
Work-related barriers, n (%)	7 (8.3)	6 (5.3)	0.4

Table 1. Patient demographic, obstetric, and social characteristics by educational attainment. Values are presented as mean $\pm$ standard deviation, median (interquartile range), or n (%), as appropriate. P values compare patients with a high school education or less with those with a college education or more.

Overall, 48.5% of participants expressed interest in receiving additional pregnancy or childbirth education, with no significant difference between patients with a high school education or less and those with a college education or higher (48.2% vs. 48.7%, $p=0.95$) (Table 2). Discussion with a provider was the most selected educational format in both groups (66.7% vs. 70.2%, $p=0.6$). Preference for provider-based or in-person education was reported by 76.2% and 80.7% of participants, respectively ($p=0.4$). Other preferred formats, including printed materials, educational videos, social media, group prenatal classes, in-person classes, and virtual classes, did not differ significantly by educational attainment (Table 3). Although educational videos were more commonly selected by patients with a college education or higher (43.0% vs. 29.8%), this difference did not reach statistical significance ($p=0.056$). Similarly, preference for digital or self-directed education did not significantly differ between groups (61.9% vs. 72.8%, $p=0.1$) (Table 3).

Prenatal Education Needs	HS or Less (n = 84)	College or More (n = 114)	P Value
Interested in more education*	40 (48.19)	55 (48.67)	0.9
Wanted more info: normal pregnancy changes	10 (11.9)	19 (16.7)	0.3
Wanted more info: induction methods	16 (19)	25 (21.9)	0.6
Wanted more info: labor process	16 (19)	18 (15.8)	0.5
Wanted more info: delivery complications	19 (22.6)	29 (25.4)	0.6
Wanted more info: breastfeeding	27 (32.1)	40 (35.1)	0.7
Wanted more info: postpartum recovery	25 (29.8)	50 (43.9)	0.04
Wanted more info: other	1 (1.2)	7 (6.1)	0.14
Number of desired education topics	1 (0, 2)	1 (0, 3)	0.44

*Missing in 2 individuals.

Table 2. Prenatal education topics selected by participants, by educational attainment. Values are presented as n (%) or median (interquartile range), as appropriate. P values compare patients with a high school education or less with those with a college education or more. Participants could select multiple education topics; therefore, percentages may not sum to 100%. The overall interest in additional prenatal education measure was missing for 2 participants.

Education Preferences	HS or Less (n = 84)	College or More (n = 114)	P Value
Discussion with provider	56 (66.7)	80 (70.2)	0.6
Printed materials	24 (28.6)	37 (32.5)	0.6
Educational videos	25 (29.8)	49 (43.0)	0.06
Social media	19 (22.6)	20 (17.5)	0.4
Group prenatal class	13 (15.5)	29 (25.4)	0.09
In-person education classes	24 (28.6)	41 (36.0)	0.3
Virtual education classes	20 (23.8)	39 (34.2)	0.1
Other	2 (2.4)	3 (2.6)	1.0
Provider/in-person preference	64 (76.2)	92 (80.7)	0.4
Digital/self-directed preference	52 (61.9)	83 (72.8)	0.1

Table 3. Preferred prenatal education formats by educational attainment. Values are presented as n (%). P values compare patients with a high school education or less with those with a college education or more. Participants could select multiple education formats; therefore, percentages may not sum 100%.

In multivariable analyses adjusted for race, insurance status, language, and parity, educational attainment was still not found to be independently associated with overall interest in additional pregnancy or childbirth education (adjusted OR, 0.765; 95% CI, 0.347–1.687; $p=0.5$) or preference for provider/in-person education (adjusted OR, 0.597; 95% CI, 0.261–1.366; $p=0.2$). These findings suggest that the similarities in overall educational interest and preferred educational delivery methods persisted after accounting for differences in key demographic and obstetric characteristics.

Patients with a high school education or less who had previous childbirth experience were more likely to report wishing they had received more information regarding normal pregnancy changes (23.8% vs. 12.3%, $p = 0.03$) and methods of labor induction (34.5% vs. 14.9%, $p = 0.001$) (Table 4). No significant differences were observed for other education topics among participants with prior childbirth experience (all $p > 0.05$). After adjusting for race, insurance status (Medicaid), language (English), and parity, patients with a high school education or less had more than twice the odds of wanting more information on normal pregnancy changes (AOR = 2.69, 95% CI: 1.01–7.15, $p = 0.048$) and labor induction methods (AOR = 2.84, 95% CI: 1.12–7.25, $p = 0.029$) compared with patients with a college education or more.

Desired Education Topic	HS or Less (n= 84)	College or More (n= 114)	P Value
Normal pregnancy changes	20 (23.81)	14 (12.28)	0.03
Induction of labor methods	29 (34.52)	17 (14.91)	0.001
Normal labor process	13 (15.48)	15 (13.16)	0.6
Delivery complications	18 (21.43)	22 (19.30)	0.7
Breastfeeding	15 (17.86)	26 (22.81)	0.4
Postpartum recovery	29 (34.52)	35 (30.70)	0.6

Table 4. Prenatal education topics participants with prior childbirth experience wished they had received more information about, by educational attainment. Values are presented as n (%). P values compare patients with a high school education or less with those with a college education or more. Participants could select multiple education topics; therefore, percentages may not sum to 100%.

Patients with a college education or more were more likely to request information regarding postpartum recovery compared with those with a high school education or less (43.9% vs. 29.8%, $p = 0.04$) (Table 2). However, after adjusting for race, insurance status (Medicaid), language (English), and parity, education level was not significantly associated with requesting postpartum recovery education (AOR = 0.48, 95% CI: 0.22–1.05, $p = 0.067$). No significant differences were observed between education groups in requests for information regarding the normal labor process (15.8% vs. 19.0%, $p = 0.5$), delivery complications (25.4% vs. 22.6%, $p = 0.6$), or breastfeeding (35.1% vs. 32.1%, $p = 0.7$). The median number of educational topics selected per participant also did not differ significantly between groups (median 1 [IQR 0–3] vs. 1 [IQR 0–2], $p = 0.44$) (Table 2).

Discussion

Patients with different levels of educational attainment differed in their preferred prenatal education topics but not in their overall interest in additional education or preferred format. Patients with lower educational attainment prioritized more counseling on normal pregnancy changes and labor induction.

The increased interest in normal pregnancy-related changes amongst patients with lower educational attainment who had prior childbirth experience (23.8% vs. 12.3%, $p=0.03$) is likely multifactorial. Patients with lower educational attainment may have less baseline exposure to physiological pregnancy-related information before or during early pregnancy [5-6]. Additionally, differences in health literacy, access to reliable resources, or familiarity navigating healthcare systems may influence what topics patients feel they need additional education in [6-8]. Providing structured anticipatory guidance on normal pregnancy-related physical changes helps patients distinguish expected gestational symptoms from acute warning signs requiring immediate clinical evaluation. This association remained statistically significant after adjustment for race, insurance status, language, and parity (adjusted OR, 2.69; 95% CI, 1.01–7.15;

p=0.048), though the modest p-value and wide confidence interval suggest this finding warrants confirmation in larger samples.

Patients with lower educational attainment who had prior childbirth experience were more than twice as likely to request information on labor induction (34.5% vs. 14.9%, p=0.001). The increased interest in induction among patients with lower educational attainment was not simply explained by less childbirth experience, as this group had higher gravidity and parity. One possible explanation may lie in the nuanced nature of induction of labor education, which includes why and when induction is recommended, medications the process can entail, alternatives, risks and benefits, and what to expect during labor. Previous research has demonstrated that childbirth education may help patients participate in decision-making regarding labor induction [9]. Furthermore, higher parity may indicate patients are more likely to consider induction for practical reasons such as arranging childcare or planning leave from work and other family responsibilities. This association persisted after multivariable adjustment (adjusted OR, 2.84; 95% CI, 1.12–7.25; p=0.029), supporting an independent relationship between educational attainment and interest in induction-related information

Patients with lower educational attainment may have had fewer opportunities to engage in detailed shared decision-making or may have experienced counseling that focused more heavily on immediate clinical recommendations rather than broader decision-making processes. However, these factors were not directly measured in our study and should therefore be considered hypotheses rather than explanations established by our data.

Patients with higher educational attainment demonstrated a greater unadjusted interest in postpartum recovery education (29.8% vs. 43.9%, p=0.04). However, this association was attenuated after adjustment for race, insurance status, language, and parity (adjusted OR, 0.48; 95% CI, 0.22–1.05; p=0.067) and did not reach statistical significance, suggesting the unadjusted difference may be explained in part by co-occurring demographic and socioeconomic factors rather than educational attainment independently. Patients with college or more education may have greater independent information-seeking around postpartum topics, or greater awareness of postpartum complications, but these explanations remain speculative given our findings.

Differences in clinical circumstances and access to consistent prenatal counseling may contribute to these education preferences, as well. Patients with lower educational attainment were also more likely to have missed prenatal visits (20.73% vs. 7.96%, p=0.01) potentially resulting in fewer opportunities for anticipatory counseling regarding delivery planning and induction. Additionally, the higher prevalence of prior cesarean delivery in this group (32.14% vs. 14.04%, p=0.002) may have increased the clinical relevance and complexity of discussions surrounding delivery planning.

Patients in both groups noted discussion with provider as their preferred method of education (66.7% vs. 70.2%, p=0.6). This finding aligns with previous studies demonstrating continued preference for face-to-face or provider-based prenatal education [8, 10]. Kovala et al. similarly found that expectant parents valued provider-delivered education among several available educational formats [8]. Though

statistically insignificant, educational videos were more commonly selected by patients with a college education or higher (43.0% vs. 29.8%, $p=0.056$). The lack of statistically significant differences across most educational formats suggests that clinicians may be able to utilize broadly accessible delivery methods while tailoring educational content to individual patient needs.

Despite the statistically significant differences observed in educational preferences, the clear intersection of education with socioeconomic and demographic factors cannot be ignored. Education preferences cannot be exclusively attributed to educational attainment, although educational attainment may have a distinct role. Patients with lower educational attainment in our cohort were also more likely to have Medicaid insurance, social work involvement, missed prenatal visits, transportation barriers, and other demographic and obstetric differences (all $p<0.05$). These overlapping factors may contribute to the observed differences in educational preferences and should be considered when interpreting our findings.

These findings can guide improved prenatal care. Topic selection that is individualized may best serve patients, as preferred topics vary. To best suit patients' needs, clinicians may offer a brief assessment of education needs during prenatal visits. For example, patients may benefit from seeing a menu of topics such as normal pregnancy changes, cesarean delivery, and warning signs to prompt discussion regarding their perceived knowledge gaps. Research has also demonstrated that the clinician who provides the education does not need to be a physician; nurse-led antenatal education has been associated with improved maternal self-efficacy across various delivery models in a recent meta-analysis [11]. Ultimately, it is essential to maintain accessible formats for all patients while tailoring the content itself.

The study includes several major strengths, one of which is that the prospective collection of patient-reported educational preferences allowed for direct assessment of informational needs that may not be captured in the medical record. Additionally, the assessment of patient preferences through a patient-completed survey allowed for a patient-centered examination of the topic. There was substantial variation in educational attainment, insurance status, obstetric history, and race/ethnicity, and both English- and Spanish-speaking patients were included.

The study was limited by its inclusion of only a single institution, which may limit generalizability. Further, the cross-sectional nature of the survey only allowed for assessment at ≥ 32 weeks, not allowing for re-assessment throughout pregnancy as needs and desires may change. Finally, educational attainment is an indirect measure of educational background and does not directly assess health literacy, pregnancy-related knowledge, or ability to access or interpret health information. Health literacy and educational attainment are related but distinct constructs, and educational attainment alone may not adequately capture patients' ability to access, understand, and apply health information [12].

Future research should build upon these findings and may include larger or multicenter cohorts that include diverse patient populations and evaluate prenatal education preferences across different settings. Future studies should also assess health literacy directly, as educational attainment is not

equivalent to health literacy and may not best capture patients' ability to access, understand, and apply health information [12]. Validation of the survey instrument in broader populations would further strengthen its use for identifying patient-specific educational needs.

Additional studies are needed to determine whether tailoring prenatal education to patient preferences improves outcomes; studies could evaluate whether individualized education improves knowledge, patient satisfaction, and confidence in pregnancy. Ultimately, identifying efficient methods to tailor educational content while maintaining accessible delivery formats may help support more patient-centered and equitable prenatal care.

Conclusions

Educational attainment was associated with differences in preferred prenatal topics of education, but not with differences in desire for education or format of education. Patients with lower educational attainment more frequently requested information regarding normal pregnancy changes and labor induction, and patients with higher educational attainment more frequently desired information regarding postpartum recovery. These findings suggest that a uniform approach to prenatal education may not adequately address individual patients' knowledge gaps. Implementing a flexible, individualized prenatal education within routine prenatal visits can ensure patient-centered, equitable prenatal counseling. Future research should evaluate whether tailored prenatal education improves health literacy, maternal satisfaction, and clinical outcomes.

Abbreviations

CI
Confidence interval
IQR
Interquartile range
IRB
Institutional Review Board
OR
Odds ratio
PDC
Prenatal Diagnostic Center
SD
Standard deviation.

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Review Board of the University of Nebraska Medical Center (IRB #0249-24-EP). Written informed consent was obtained from all participants prior to participation.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to restrictions related to participant privacy and institutional policies but may be available from the corresponding author upon reasonable request and with appropriate institutional approval.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

RA and RR conceptualized the study. ZK contributed to the conceptualization and development of the specific research question addressed in this manuscript. ZK, RA, SO, RW, HR, and RR contributed to data collection. ZK, RA, HR, and RW contributed to data extraction. SO and MG conducted the statistical analysis. ZK drafted the manuscript. RA, SO, RW, HR, MG, and RR contributed to manuscript review and revision. All authors read and approved the final manuscript.

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Figures

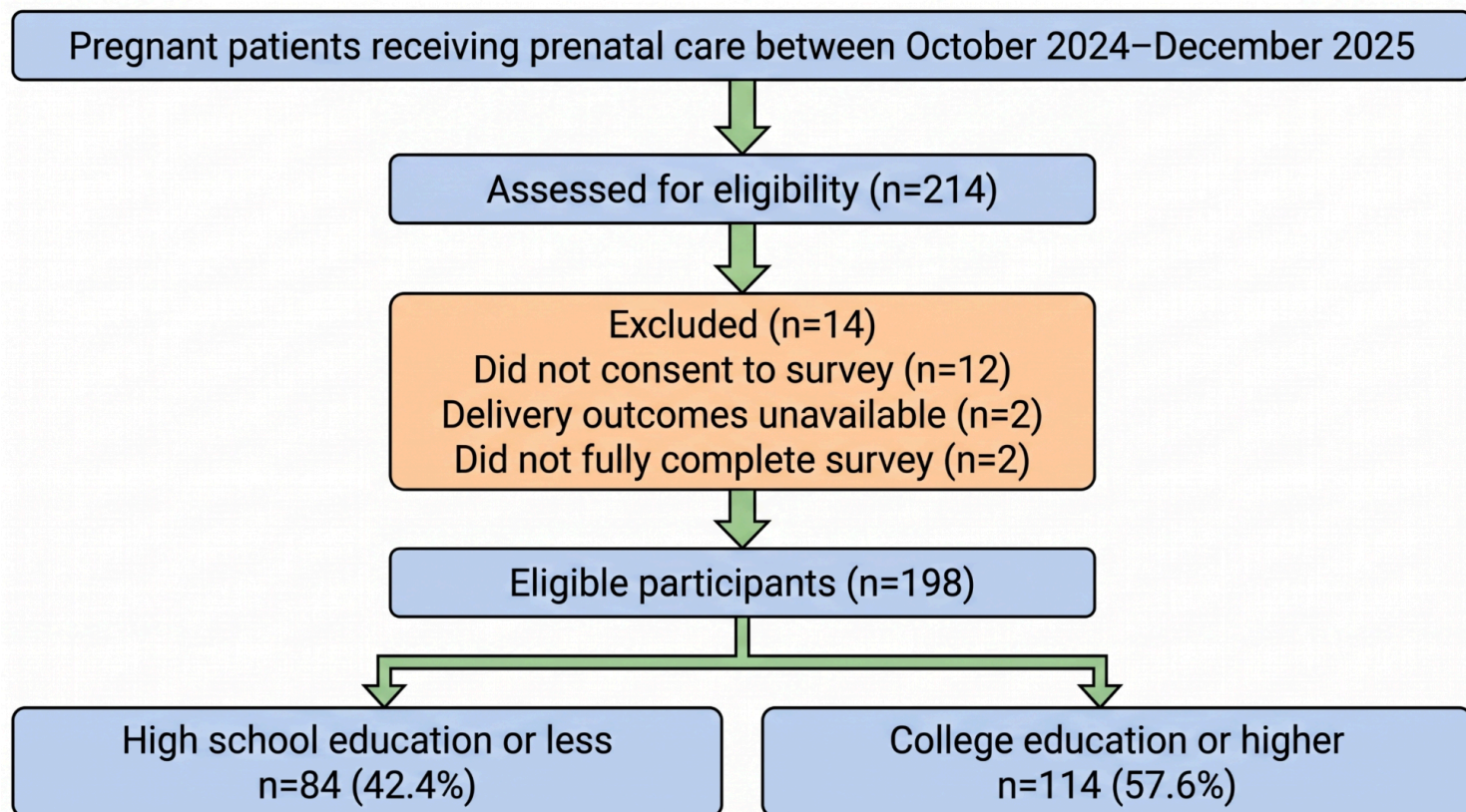


Figure 1

Study participant flow diagram. Flow of pregnant patients assessed for eligibility, exclusions, and final study population, including distribution by educational attainment.