

A Comparative Study of Pregnancy Outcome in Elderly Primigravida and Younger Primigravida

Smitha K¹, Veena B T², Reethu Varadarajan³, Sushma⁴

¹Professor, Department of Obstetrics and Gynaecology, Kempegowda Institute of Medical Sciences, Bangalore, Karnataka, India

²Professor, Department of Obstetrics and Gynaecology, Kempegowda Institute of Medical Sciences, Bangalore, Karnataka, India

³Professor, Department of Obstetrics and Gynaecology, Kempegowda Institute of Medical Sciences, Bangalore, Karnataka, India

⁴Post Graduate, Department of Obstetrics and Gynaecology, Kempegowda Institute of Medical Sciences, Bangalore, Karnataka, India

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Corresponding author: Dr. Sushma

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Abstract

Background: Societal changes in maternal age demographics, marked by increased educational and professional pursuits, necessitate an in-depth examination of pregnancy outcomes for elderly primigravida. Understanding the complexities surrounding advanced maternal age is crucial for tailoring effective antenatal care and interventions to ensure favorable maternal and neonatal outcomes.

Objective: This study aims to compare pregnancy outcomes between elderly primigravida (≥ 35 years) and younger primigravida.

Methods: A 18-month comparative observational study at Kempegowda Institute of Medical Sciences included three participant groups: outpatient antenatal attendees, reproductive-age inpatients, and women aged ≥ 35 delivering at KIMS Hospital. Inclusion criteria focused on primigravida above 35 years, excluding pre-existing medical conditions. Data were expressed through tables, figures, and charts, with Chi-square test for statistical analysis.

Results: Elderly primigravida had a significantly higher mean age (35.96 vs. 24.34). They exhibited higher rates of complications (hypothyroidism, IUGR, breech presentation, gestational diabetes, cervical incompetence) and increased preterm births. Neonatal outcomes revealed lower birth weights and higher NICU admission rates in elderly primigravida.

Discussion: Findings align with literature on risks for elderly primigravida. The study emphasizes the need for tailored antenatal care and strategies to mitigate risks associated with advanced maternal age, ensuring favorable neonatal outcomes. Further research should explore additional factors influencing diverse populations' pregnancy outcomes and refine optimal maternal and neonatal healthcare strategies.

Keywords: Elderly Primigravida, Pregnancy Outcomes, Advanced Maternal Age, Obstetric Complications, Neonatal Health, Comparative Analysis.

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Introduction

Over the years, societal shifts marked by increased educational attainment, widespread adoption of birth control methods, and a rising trend of women engaging in professional pursuits have led to a noticeable demographic change in maternal age. The International Federation of Obstetrics and Gynaecology, in 1958, formally identified women aged 35 years or older at their first delivery as "elderly primigravida." [1] This demographic shift has resulted in a growing number of women experiencing motherhood at an advanced age, prompting concerns regarding fertility, pregnancy outcomes, and associated medical risks. [2]

Advanced maternal age is associated with decreased fertility and an elevated risk of adverse pregnancy outcomes. Notably, poor oocyte quality in older mothers heightens the likelihood of chromosomal anomalies, aneuploidy, and spontaneous abortions. Beyond reproductive challenges, elderly primigravida women face an increased susceptibility to various medical conditions. [3] The literature underscores their heightened risk for complications such as malposition, malpresentation, pregnancy-induced hypertension (PIH), gestational diabetes mellitus (GDM), induction of labor, non-progress of labor,

instrumental delivery, cesarean section, and postpartum hemorrhage.[4]

The emotional landscape of pregnancy in advanced age is diverse, ranging from happiness to anxiety. The term "elderly primigravida," defined as a woman aged 35 or older at her first delivery, carries historical significance in obstetrics. However, there is variation in the use of terminology, with some studies considering women aged 25 and above in their first pregnancy as "elderly primigravida" and introducing the alternative term "mature primigravida." [5]

Despite the established risks associated with advanced maternal age, conflicting evidence exists regarding the classification of elderly primigravida as uniformly high risk. While certain studies emphasize an increased incidence of complications, including pregnancy-induced hypertension, malposition, induction of labor, prolonged labor, instrumental deliveries, cesarean section, others argue for a more nuanced approach. Some studies suggest that, aside from an elevated cesarean section rate, there may be no additional risks associated with advancing age in primigravida.[6] Advocates for a conservative management approach highlight the effectiveness of modern perinatal care in mitigating potential complications in older primigravida.[7]

This study seeks to contribute to the existing body of knowledge by comprehensively assessing pregnancy outcomes in elderly primigravida and comparing them with those of younger primigravida, shedding light on the complexities and nuances surrounding this demographic shift in maternal age.[8]

Materials and Methods

This study presents a comprehensive comparative analysis of pregnancy outcomes between elderly primigravida and younger primigravida. The primary objective was to assess the mode of conception and obstetric complications, while secondary objectives focused on identifying the mode of delivery, neonatal complications, and NICU admissions in both groups.[9] Data for this research were sourced from three distinct groups: women attending the outpatient department (OPD) for antenatal checkup, pregnant women of the reproductive age group admitted to KIMS Hospital, and pregnant women aged 35 years and above admitted at KIMS Hospital in Bangalore. The study employed a comparative observational design over a period of 18 months, from November 2022 to June 2023, conducted at Kempegowda Institute of Medical Sciences. Each group consisted of 50 participants, selected through simple purposive sampling.[10]

Inclusion Criteria

1. Primigravida Above 35 Years

- Participants included in the study are primigravida women aged 35 years and above.
- This criterion ensures a focus on the elderly primigravida population, aligning with the defined age category for this study.

2. Department of Obstetrics and Gynaecology at KIMS Hospital

- Participants must be admitted to the Department of Obstetrics and Gynaecology at Kempegowda Institute of Medical Sciences, Bangalore.
- This criterion ensures that the study captures data from a specific healthcare setting, enhancing the uniformity of medical care and information.

Exclusion Criteria

1. Pre-existing Medical Conditions

- Participants with pre-existing medical conditions will be excluded from the study.
- This criterion aims to isolate the impact of maternal age on pregnancy outcomes by excluding potential confounding variables associated with existing health conditions.

Inclusion Criteria for Data Sources

1. Women Attending OPD for Antenatal Checkup

- Data will be collected from women attending the outpatient department (OPD) for antenatal checkup.
- This criterion ensures the inclusion of participants in the early stages of pregnancy, offering insights into the initial aspects of their maternal health.

2. Pregnant Women of Reproductive Age Group Admitted to KIMS Hospital

- Information will be gathered from pregnant women of the reproductive age group who are admitted to KIMS Hospital.
- This criterion broadens the scope of the study to include pregnant women with varying age profiles, providing a comprehensive understanding of maternal health.

3. Pregnant Women Aged 35 Years and Above Admitted at KIMS Hospital

- Data will be collected from pregnant women aged 35 years and above delivering at KIMS Hospital, Bangalore.
- This criterion specifically targets the elderly primigravida population, enabling a focused

analysis of pregnancy outcomes in this age group.

Sampling Criteria

1. Sample Size

- The study will include 50 participants in each group (elderly primigravida and younger primigravida).
- This criterion ensures a sufficiently sized sample for robust statistical analysis, allowing for meaningful comparisons between the two age groups.

2. Simple Purposive Sampling

- Participants will be selected using simple purposive sampling.
- This criterion facilitates a targeted and purpose-driven approach to participant inclusion, ensuring representation from diverse backgrounds within the defined criteria.

These inclusion and exclusion criteria establish a clear framework for participant selection and data collection, contributing to the reliability and validity of the study's findings.

Data Presentation: In this study, the presentation of data was conducted through the utilization of tables, figures, and charts. These visual aids served as effective tools for organizing and communicating the collected information in a clear and comprehensible manner. The diverse nature of data, ranging from demographic details to pregnancy outcomes, was systematically presented to facilitate a comprehensive understanding of the study parameters.

Expression of Data: The data obtained from the study participants was expressed as simple percentages. This method allowed for a straightforward representation of the prevalence and distribution of various factors within the study and control groups. Simple percentages were chosen for their clarity and ease of interpretation, enabling readers to grasp the key findings at a glance.

Statistical Analysis: To assess the significance between the study and control groups, the Chi-square test was employed. This statistical method is particularly well-suited for categorical data analysis and was used to determine whether observed differences between the two groups were statistically significant or occurred by chance. The Chi-square test allowed for a rigorous examination of associations and dependencies, contributing to the robustness of the study's findings.

The decision to use the Chi-square test was grounded in its ability to handle categorical variables, making it suitable for comparing

proportions and distributions. This analytical approach enhanced the statistical rigor of the study, providing a basis for drawing meaningful conclusions regarding the relationships and differences observed between the study and control groups.

The study ensured a comprehensive and visually accessible presentation of data through tables, figures, and charts, with a focus on expressing information as simple percentages. The Chi-square test was then applied to rigorously assess the significance of observed differences, adding a statistical dimension to the interpretation of the study's outcomes.

Results

The study sample exhibited a diverse age distribution, with the majority falling within the range of 21-35 years, while 50.0% represented women aged over 35 years. In terms of the duration of married life, 61.0% reported being married for 1-5 years, reflecting a substantial proportion in the early stages of marriage. The analysis of conception methods revealed that 89.0% of pregnancies occurred naturally, while 3.0% and 8.0% utilized in vitro fertilization (IVF) and ovulation induction, respectively.

Quantitatively, the mean age was 30.15 years, with a standard deviation of 6.21, and the age range varied from 18 to 41 years. The majority reported a married life duration of 1-5 years (61.0%), with additional categories including less than a year (14.0%), 6-10 years (18.0%), and over 10 years (7.0%). Natural conception prevailed, constituting 89.0% of cases, while assisted reproductive technologies represented a smaller percentage. This comprehensive analysis provides a detailed overview of the study characteristics, setting the stage for a nuanced exploration of potential associations with pregnancy outcomes.

The distribution of maternal complications among the study patients showcases a diverse array of conditions. Hypothyroidism emerged as the most prevalent complication, affecting 22.0% of participants, followed by preterm rupture of membranes (17.0%), intrauterine growth restriction (8.0%), and breech presentations (8.0%). Gestational diabetes mellitus, cervical incompetence, corrected anemia, and gestational hypertension each constituted 7.0% of cases. Other complications, such as oligohydramnios, gestational thrombocytopenia, preterm labor, moderate anemia, decreased to perception of foetal movements, meconium staining, history of myomectomy, fetal distress, infertility, severe preeclampsia, monochorionic and dichorionic diamniotic pregnancies, vacuum-assisted delivery, low-lying placenta, and cases with no reported complications, ranged from 1.0% to 3.0%. This

detailed qualitative and quantitative analysis provides a comprehensive understanding of the prevalence and spectrum of maternal complications, setting the groundwork for further

exploration into their implications for pregnancy outcomes and maternal well-being.

Table 1: Distribution of Study Characteristics among study samples

Distribution of Study Characteristics among study samples				
Variable	Category	n	%	
Age	≤ 20 yrs.	6	6.0%	
	21-25 yrs.	26	26.0%	
	26-34 yrs.	18	18.0%	
	> 35 yrs.	50	50.0%	
		Mean		SD
		Mean	30.15	6.21
	Range	18 - 41		
Married Life	< 1 year	14	14%	
	1-5 years	61	61%	
	6-10 years	18	18%	
	> 10 years	7	7%	
Type of Conception	Natural	89	89%	
	IVF Conception	3	3%	
	Ovulation Induction	8	8%	

Table 2: Distribution of Maternal Complications among study patients

Distribution of Maternal Complications among study patients			
Variable	Category	N	%
Maternal Complications	Hypothyroidism	22	22%
	PROM	17	17%
	IUGR	8	8%
	Breech	8	8%
	Gestational Diabetes Mellitus	7	7%
	Cervical Incompetence	7	7%
	Corrected Anemia	6	6%
	Gestational Hypertension	6	6%
	Oligohydraminos	3	3%
	Gestational Thrombocytopenia	3	3%
	Delivery	3	3%
	Moderate Anemia	2	2%
	Decreased PFM	2	2%
	Meconium Staining	2	2%
	Fetal Distress	1	1%
	Infertility	1	1%
	Severe Preeclampsia	1	1%
	Monochorionic Diamniotic	1	1%
	Dichorionic Diamniotic	1	1%
	Vacuum Assisted Delivery	1	1%
Low Lying Placenta	1	1%	
Nil	1	1%	

The distribution of gestational age among the study patients demonstrated a varied representation, with 3.0% of pregnancies falling within the 26-31 weeks category, 22.0% within the 32-36 weeks category, and the majority, comprising 75.0%, within the 37-40 weeks category. Notably, the prevalence of pregnancies reaching full term was evident. Regarding the type of delivery, the study patients experienced a diverse range of delivery modes. Full-term vaginal delivery was observed in 31.0%

of cases, while preterm vaginal delivery occurred in 2.0%. Emergency lower segment cesarean section (LSCS) was performed in 30.0% of cases, and elective LSCS constituted the majority, representing 37.0% of deliveries. This comprehensive analysis provides a nuanced understanding of the gestational age distribution and delivery modes within the study population, laying the groundwork for further exploration into

factors influencing these aspects of childbirth outcomes.

Table 3: Distribution of Gestational Age & Type of Delivery among study patients

Distribution of Gestational Age & Type of Delivery among study patients			
Variable	Category	n	%
Gestational Age	26-31 weeks	3	3%
	32-36 weeks	22	22%
	37-40 weeks	75	75%
Type of Delivery	Full Term Vaginal Delivery	31	31%
	Preterm Vaginal Delivery	2	2%
	Emergency LSCS	30	30%
	Elective LSCS	37	37%

The neonatal outcomes among study patients revealed a diverse distribution of birth weights, with 14.0%, 25.0%, 38.0%, 18.0%, and 5.0% of neonates falling into the 500mg to 2.0 Kgs., 2.1-2.5 Kgs., 2.6-3.0 Kgs., 3.1-3.5 Kgs., and > 3.5 Kgs. categories, respectively. The mean birth weight was 2.63 Kgs, with a range spanning from 0.88 to 4.00 Kgs, indicating considerable variability in newborn sizes within the study. NICU admission rates reflected that 36.0% of neonates required

specialized care, while 64.0% did not. This combined qualitative and quantitative analysis underscores the heterogeneity in neonatal health outcomes, providing crucial insights for further exploration into factors influencing birth weights and the necessity for neonatal intensive care, ultimately contributing to a comprehensive understanding of neonatal well-being within the study population.

Table 4: Distribution of Neonatal Outcomes among study patients

Distribution of Neonatal Outcomes among study patients				
Variable	Category	n	%	
Birth Weight	500mg to 2.0 Kgs.	14	14%	
	2.1-2.5 Kgs.	25	25%	
	2.6-3.0 Kgs.	38	38%	
	3.1-3.5 Kgs.	18	18%	
	> 3.5 Kgs.	5	5%	
		Mean		SD
		Mean	2.63	0.62
	Range	0.88 - 4.00		
NICU Admission	Yes	36	36%	
	No	64	64%	

The comparative analysis between two distinct groups, Elderly Primigravida (Group A) and Young Primigravida (Group B), revealed significant differences in age distribution, with Group A having a substantially higher mean age of 35.96 years (SD=1.34) compared to Group B with a mean age of 24.34 years (SD=2.71) ($p < 0.001$). Group A predominantly reported a married life duration of 1-5 years (56.0%), while Group B showed a similar trend (66.0%). Notably, none in Group B reported a married life of more than 10 years, contrasting with 14.0% in Group A. Although no significant difference was found in the type of conception ($p = 0.17$), natural conception prevailed in both groups (88.0% in Group A and 90.0% in Group B). This combined qualitative and quantitative analysis offers insights into the distinctive characteristics of elderly and young primigravida, laying the groundwork for a nuanced understanding of factors influencing pregnancy outcomes in these populations.

The comparative analysis of maternal complications between Elderly Primigravida (Group A) and Young Primigravida (Group B) highlighted significant differences in the prevalence of various complications. Group A demonstrated a notably higher incidence of hypothyroidism (44.0%), whereas none in Group B reported this complication ($p < 0.001$). Additionally, Group A exhibited a higher occurrence of intrauterine growth restriction (IUGR) (16.0%) and breech presentation (16.0%) compared to Group B, where these complications were absent ($p = 0.003$ for both). Gestational diabetes mellitus and cervical incompetence were more prevalent in Group A (12.0% and 2.0%, respectively) than in Group B (1.0% and 6.0%, respectively), with both differences being statistically significant ($p = 0.04$). Although not statistically significant, Group A had a higher incidence of preterm rupture of membranes (PROM) (22.0%) compared to Group B (12.0%) ($p = 0.18$). No significant differences were observed

in corrected anemia and gestational hypertension between the two groups ($p = 0.40$ for both). This comprehensive analysis provides insights into the

distinct maternal challenges faced by elderly and young primigravida, informing tailored approaches to maternal care for these populations.

Table 5: Distribution of study characteristics between 2 groups

Distribution of study characteristics between 2 groups						
Variable	Category	Group A		Group B		p-value
		Mean	SD	Mean	SD	
Age	Mean	35.96	1.34	24.34	2.71	<0.001 ^a
	Range	34 – 41		18-30		
		n	%	n	%	
Married Life	< 1 year	5	10.0%	9	18.0%	0.03 ^b
	1-5 years	28	56.0%	33	66.0%	
	6-9 years	10	20.0%	8	16.0%	
	≥ 10 years	7	14.0%	0	0.0%	
Type of Conception	Natural	43	86%	45	90%	0.17 ^b
	IVF Conception	4	8%	0	0%	
	Ovulation Induction	3	6%	5	10%	

* Statistically Significant

Note: a. Mann Whitney Test & b. Chi Square Test. Group A: Elderly Primigravida & Group B: Young Primigravida

Table 6: Comparison of Maternal Complications between 2 groups using Chi Square Test

Comparison of Maternal Complications between 2 groups using Chi Square Test					
Complications	Group A		Group B		p-value
	n	%	n	%	
Hypothyroidism	22	44%	0	0%	<0.001*
PROM	11	22%	6	12%	0.18
IUGR	8	16%	0	0%	0.003*
Breech	8	16%	0	0%	0.003*
Gestational Diabetes Mellitus	6	12%	1	2%	0.04*
Cervical Incompetence	1	2%	6	12%	0.04*
Corrected Anemia	2	4%	4	8%	0.40
Gestational Hypertension	4	8%	2	4%	0.40

* - Statistically Significant

The comparative analysis of maternal outcomes between Elderly Primigravida (Group A) and Young Primigravida (Group B) revealed noteworthy distinctions in gestational age and modes of delivery. Group A exhibited a higher percentage of pregnancies within the 26-31 weeks category (6.0%) compared to Group B (0.0%) ($p = 0.04$), indicating a potential increased risk of preterm births in elderly primigravida. Additionally, Group A displayed a higher prevalence of preterm vaginal deliveries (4.0%) and emergency lower

segment cesarean sections (LSCS) (60.0%), suggesting heightened obstetric interventions and complications. In contrast, Group B demonstrated a larger proportion of full-term vaginal deliveries (42.0%) and elective LSCS (26.0%), signifying a more favorable outcome for young primigravida ($p < 0.001$). This comprehensive analysis underscores the distinct maternal challenges faced by each group, contributing valuable insights for tailored maternal care strategies and interventions.

Table 7: Comparison of Maternal Outcomes between 2 groups using Chi Square Test

Comparison of Maternal Outcomes between 2 groups using Chi Square Test						
Variables	Complications	Group A		Group B		p-value
		n	%	n	%	
Gestational Age	26-31 weeks	3	6.0%	0	0.0%	0.04*
	32-36 weeks	14	28.0%	8	16.0%	
	37-40 weeks	33	66.0%	42	84.0%	
Type of Delivery	Full Term Vaginal Delivery	10	20.0%	21	42.0%	<0.001*
	Preterm Vaginal Delivery	2	4.0%	0	0.0%	
	Emergency LSCS	30	60.0%	16	32%	
	Elective LSCS	8	16.0%	13	26%	

*Statistically Significant

The comparative analysis of neonatal outcomes between Elderly Primigravida (Group A) and Young Primigravida (Group B) unveiled significant disparities in both birth weight and NICU admission rates. Group A exhibited a lower mean birth weight (2.49, SD=0.59) compared to Group B (2.77, SD=0.61) ($p = 0.04$), suggesting potential differences in neonatal health between the two groups. NICU admission rates were notably higher in Group A (52.0%) compared to Group B (20.0%)

($p = 0.001$), underscoring a heightened prevalence of neonatal complications in the offspring of elderly primigravida. The majority of neonates in Group B (80.0%) did not require NICU admission, contrasting with Group A where 48.0% did not require NICU care. This comprehensive analysis emphasizes the impact of maternal age on neonatal outcomes, emphasizing the need for tailored interventions and neonatal care strategies based on maternal age.

Table 8: Comparison of Neonatal Outcomes between 2 groups

Comparison of Neonatal Outcomes between 2 groups						
Variable	Category	Group A		Group B		p-value
		Mean	SD	Mean	SD	
Birth Weight	Mean	2.49	0.59	2.77	0.61	0.04 ^{*a}
	Range	0.88 - 3.60		1.20 - 4.00		
		n	%	N	%	
NICU Admission	Yes	26	52.0%	10	20.0%	0.001*
	No	24	48.0%	40	80.0%	

*Statistically Significant.

Note: a. Mann Whitney Test & b. Chi Square Test

Discussion

The study conducted a comprehensive comparative analysis of pregnancy outcomes between elderly primigravida (Group A) and younger primigravida (Group B) women. The age distribution revealed a significant difference, with Group A having a mean age of 35.96 years compared to 24.34 years in Group B. This aligns with the classification of elderly primigravida, emphasizing the demographic shift in maternal age.

In terms of maternal complications, Group A exhibited a higher prevalence of hypothyroidism (44.0%), IUGR (16.0%), breech presentation (16.0%), gestational diabetes mellitus (12.0%), and cervical incompetence (2.0%) compared to Group B, where these complications were less frequent or absent. The differences were statistically significant, highlighting the unique challenges faced by elderly primigravida. However, no significant differences were observed in corrected anemia and gestational hypertension.

The analysis of maternal outcomes revealed that Group A had a higher proportion of pregnancies in the 26-31 weeks category (6.0%), indicating an increased risk of preterm births compared to Group B (0.0%). Group A also had a higher prevalence of preterm vaginal deliveries (4.0%) and emergency LSCS (60.0%), suggesting increased obstetric interventions. In contrast, Group B demonstrated a larger proportion of full-term vaginal deliveries (42.0%) and elective LSCS (23%), indicating a more favorable outcome.

The neonatal outcomes analysis indicated that Group A had a lower mean birth weight (2.49) compared to Group B (2.77), with a statistically

significant difference ($p = 0.04$). NICU admission rates were notably higher in Group A (52.0%) compared to Group B (20.0%), emphasizing a heightened prevalence of neonatal complications in the offspring of elderly primigravida.

The findings underscore the complex interplay of maternal age with maternal and neonatal outcomes. Advanced maternal age, as seen in elderly primigravida, is associated with a higher risk of complications such as hypothyroidism, IUGR, breech presentation, and gestational diabetes. The increased prevalence of preterm births and higher rates of NICU admissions in neonates of elderly primigravida highlight the need for tailored interventions and neonatal care strategies based on maternal age.

The study contributes valuable insights into the challenges faced by elderly primigravida, emphasizing the importance of personalized antenatal care and obstetric management for this demographic. The findings also prompt further research to explore additional factors influencing pregnancy outcomes in both elderly and younger primigravida populations. Overall, the study enhances our understanding of the nuances associated with the demographic shift in maternal age and its implications for maternal and neonatal health.

Conclusion

This study highlights significant differences in pregnancy outcomes between elderly primigravida (women aged 35 years and above at their first delivery) and younger primigravida. Elderly primigravida showed a higher prevalence of complications, including hypothyroidism,

intrauterine growth restriction, breech presentation, and gestational diabetes mellitus. Maternal outcomes revealed an increased risk of preterm births and more obstetric interventions among elderly primigravida. Neonatal outcomes indicated lower mean birth weights and higher NICU admission rates in the offspring of elderly primigravida. These findings emphasize the need for tailored antenatal, obstetric, and neonatal care strategies for advanced maternal age. The study contributes valuable insights to maternal healthcare, advocating for personalized approaches to address the unique challenges associated with advanced maternal age. Further research is essential to explore additional factors influencing pregnancy outcomes in diverse populations.

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