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Associated Risk Factors of Adverse Pregnancy Outcomes among Women of Reproductive Age in India: A Study Based on NFHS-5

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Abstract

Adverse pregnancy outcomes (APOs) indicate a multifactorial outcome that includes miscarriage, abortion, stillbirth, low birth weight, etc. They are indicators of the quality of maternal and child health care services. The present study is designed to assess the associated risk factors of APOs among women of reproductive age group (15-49) years at the national level. The current study uses the latest National Family Health Survey (NFHS-5) data conducted during 2019-2021. Univariate (Chi-square) and multivariate logistic models have been used to identify the potential risk factors associated with APOs. Out of 1,63,283 pregnancy registered cases, 16, 538 (10%) pregnancies had been experienced with APOs. The risk of APOs was significantly associated with socio-demographic and economic factors. The findings of the results could help the policymakers to bring in appropriate policy intervention to improve maternal and fetal outcomes in a target-oriented approach. The outcomes of the study also suggest that there are still inadequacies in terms of the availability of adequate healthcare apparatus in the country resulting in such a high incidence of APOs. Moreover, a lack of awareness among the people about various factors leading to favourable birth outcomes can also be attributed to such a high incidence of APOs.

Keywords

Adverse pregnancy outcomes, binary logistic regression, national family health survey, miscarriage, abortion, stillbirth

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Introduction

Adverse pregnancy outcomes (hereafter APOs) are a broad term comprising health problems that occur to the mother, the newborn, or both during pregnancy, labor and delivery, and the postpartum period. Some of the common pregnancy complications include antepartum haemorrhage (APH), hyperemesis gravidarum, postpartum hemorrhage (PPH), spontaneous abortion, stillbirth / intrauterine fetal death, induced abortion, early neonatal death, low birth weight, premature rupture of membranes (PROM), obstructed labor, hypertensive disorders of pregnancy, prematurity, uterine rupture, and puerperal sepsis (Tadese et al. 2022). Pregnancy outcome or birth outcome is the outcome of fertilization occasions that befall the newborn toddler from the age of practicability (28 weeks) to the first weeks of life. Evidence suggests that there is significant inequality in access to essential health services, including services for pregnancy and childbirth (Kumar et al. 2019; Mousumi 2015). Around 1.9 million stillbirths, or one every 16 seconds were babies born with no sign of life at 28 weeks of pregnancy or later occurred worldwide (Unicef 2022). American College of Obstetricians and Gynecologists (ACOG 2015), estimates that abortion, which is the most common APO stood at 26% and miscarriage at 10% of total APOs in developing countries. Most often in a developing nation, a woman dies each minute of every day from complications related to pregnancy or childbirth. While pregnancy-related complications are found to be the leading causes of death and disability for women aged 15-49 in developing countries. In 2017, the WHO recorded approximately 295,000 maternal deaths following pregnancy and childbirth: 94% of these deaths occurred in low-middle income settings with Sub-Saharan Africa (SSA) and Southern Asia accounting for 86%. These have led to calls for more actions to curb the situation as highlighted in Sustainable Development Goals (SDG) three, which targets a reduction in the global maternal mortality ratio to less than 70 per 100,000 live births by 2030 (Duodu et al. 2022).

Multiple factors like maternal age group (Patel et al. 2021; Paul 2018; Dhaded et al. 2018), place of residence, mother's educational level, wealth index, religion, and caste. BMI, mother's anemia level (Patel et al. 2021), lack of ANC (Kassahun et al. 2019), and chronic medical condition (Tsegaye & Kassa 2018) are some of the identified factors that can affect the APOs. Rawat et al. 2023 in their study highlight gestational diabetes mellitus (GDM) is an increasingly common medical complication during pregnancy and is associated with APOs. Thus, APOs can be prevented and treated with immunization, nutrition, supplementation, and routine screening for specific diseases (Chaibva 2014). Antenatal acquaintances provide a window of opportunity to detect and possibly prevent APOs. The World Health Organization (WHO 2016) envisions a world where every pregnant woman and newborn receives quality care throughout the pregnancy, childbirth, and postnatal period. Within the continuum of reproductive health care, ANC provides a platform for important healthcare functions, including health promotion, screening and diagnosis, and disease prevention. Muluneh et al. 2022, found in their study that less utilization of maternal health services like ANC because of poor transportation facilities which causes an increase in APOs. Over the last few years, India has achieved significant improvement in the coverage of maternal healthcare, including ANC, through various programs (Singh et al. 2019).

The present study is based on the registered pregnant women in the selected study area using the latest national family health survey. The current study deliberates APOs as miscarriage, abortion, and stillbirth among women of reproductive age. This study aims to obtain associated potential risk factors including the socio-demographic, economic, and medical factors of APOs among Women of Reproductive Age 15-49 years in India using a recent nationally representative survey.

Methods

Data source

The data for this current study has been extracted from the DHS (Demographic and Health Surveys) Program [https://dhsprogram.com/data/available-datasets.cfm] with main sourced from fifth round of National Family Health Survey (NFHS-5), conducted during 2019-21 under the Ministry of Health and Family Welfare (MoHFW) designated, 'International Institute for Population Sciences' (IIPS), Mumbai. NFHS-5 provides information for 707 districts, 28 states, and 8 union territories. The survey follows a stratified two-stage sampling design to select the eligible woman for the interview to provide information on sexual behavior; husband's background and women's work; HIV/AIDS knowledge, attitudes, and behavior; and domestic violence only at the state level. In the interviewed households 7,24,115 eligible women aged between 15-49 years were identified for individual women's interviews. The primary objective of the 2019-21 rounds of NFHS-5 is to provide essential data on health and family welfare, as well as data on emerging issues in these areas, such as levels of fertility, infant and child mortality, maternal and child health, and other health and family welfare indicators by background characteristics at the national and state levels (IIPS & ICF 2021).

Study population and design

This was a population-based cross-sectional study. In this study, APOs were used to assess miscarriage, abortion, and stillbirth of women aged 15-49 from data. For our analysis, a combined individual data set of married and registered pregnancies is being considered for establishing the prevalence of APOs with the target population being the 'pregnancy registered married women' aged between 15-49 years which numbers a total of 1,63,283 study population nationwide. The outcome variable was defined as APOs among reproductive women, which was dichotomized as '1' for 'yes/APOs occurred' and '0' for 'no/ APOs not occurred'. A detailed description of the study population was explained in the methodological flow chart section given below (Figure 1).

Statistical analysis

SPSS version 20.0 was used to clean and analyze the data. Binary logistic regression was applied to identify the association between selected determinants of APOs among women of reproductive age in India. The statistical association is declared significant if $p<0.05$.

Logistic regression is the usual linear regression analysis where the dependent (outcome or response) variable is dichotomous (binary). It represents the relationship between one dependent binary variable with a set of independent (predictor or explanatory) variables.

Let N be no. of 'Married and Pregnancy Registered Women' age between 15-49 years is the value of dichotomous outcome variable identifies 'APOs/Pregnancy end in miscarriage, abortion or stillbirth'. The corresponding logistic regression model is defined as
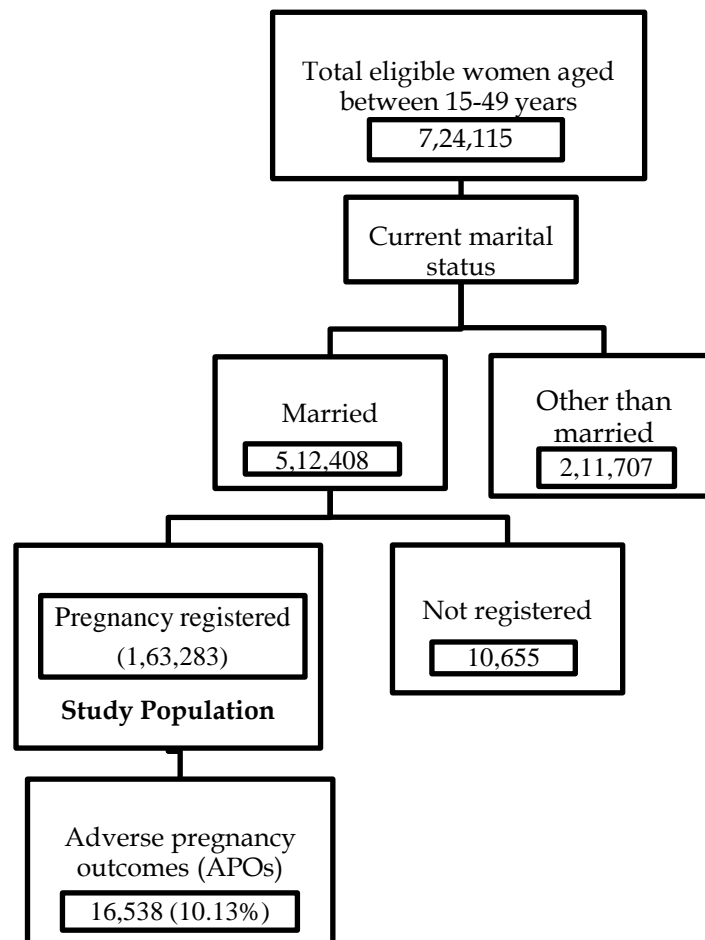
$$log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 * Maternal\ age + \beta_2 * Education + \cdots + \beta_{n-1} * Birth\ order + \beta_n * BMI \ \ \dots\dots(1)$$

Here $p = P(Y_{i=1})$ i value of dichotomous variable identified as 'Women have APOs' and $\beta_i's$ are regression coefficients. In all cases, the p–value $<$ (0.05) is considered statistically significant.

Results

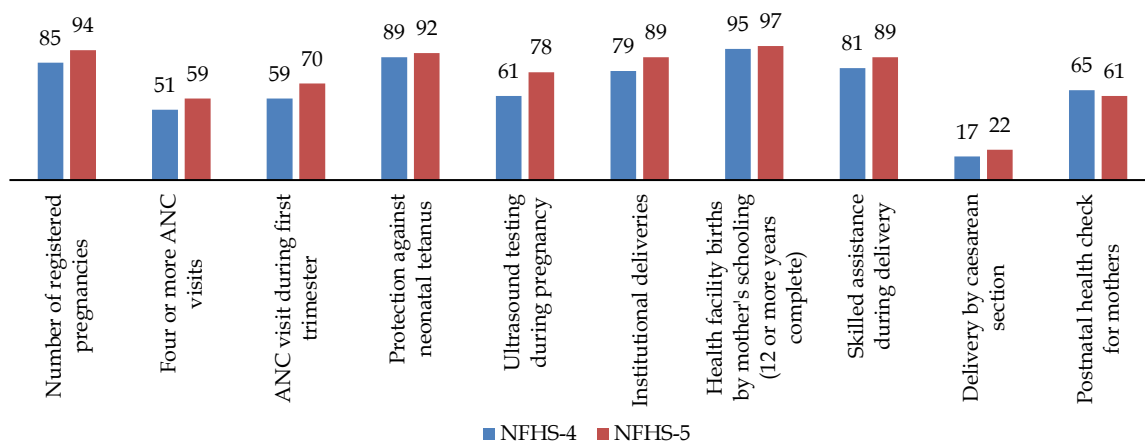### Variation in Maternal and Child Health Indicators: A Comparative Picture

The survey outcomes of NFHS 5 and NFHS 4 have produced different results and the academia should know the outcomes of NFHS 5 over NFHS 4. Because this will not only showcase improvements or deterioration that might have happened during the intervening period. NFHS 4 was conducted during the year 2015-16, while NFHS 5 was conducted over 2019-21. Many data points like the ones presented in this article such as APOs, have improved between these referenced surveys, indicating improved success of MCH-targeted healthcare plans and *programs*. They not only speak about the quality of policy intervention but also the path ahead.

Figure 1 Methodological Flow chart

Total eligible women aged between 15-49 years

7,24,115

Current marital status

Married

5,12,408

Other than married

2,11,707

Pregnancy registered (1,63,283)

Study Population

Not registered

10,655

Adverse pregnancy outcomes (APOs)

16,538 (10.13%)

That's why these developments must be recorded and included in the literature. The current study is an attempt at this process.

Figure 2 shows variation in different maternal health indicators between NFHS 4 and NFHS 5. Among the indicators presented above, except postnatal medical checkups for mothers, all other

indicators have improved in NFHS 5 vis-à-vis NFHS 4. Figure 3 on the other hand throws light on child health indicators and variations therein between the two referenced surveys. Here, we observe that all the indicators of child health under consideration except low birth weight have witnessed significant progress in NFHS 5 over and above NFHS 4.

Indicator	NFHS-4	NFHS-5
Number of registered pregnancies	85	94
Four or more ANC visits	51	59
ANC visit during first trimester	59	70
Protection against neonatal tetanus	89	92
Ultrasound testing during pregnancy	61	78
Institutional deliveries	79	89
Health facility births by mother's schooling (12 or more years complete)	95	97
Skilled assistance during delivery	81	89
Delivery by caesarean section	17	22
Postnatal health check for mothers	65	61

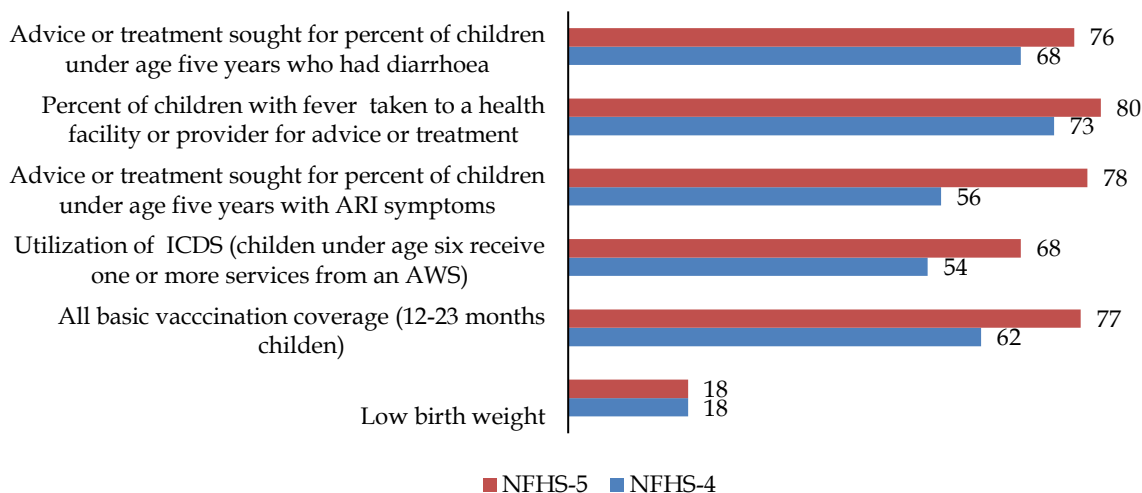**Figure 2** Maternal Health Indicators (%) (NFHS-4 and NFHS-5)

Figure 3 Child Health Indicators (%) (NFHS-4 and NFHS-5)

State-wise Prevalence of APOs as per NFHS 4 vs NFHS 5: A Comparative Picture

Figure 4 given above depicts a state / UT-wise comparative picture of the prevalence of outcomes during the survey period. As per NFHS 4, the prevalence of APOs in India stood at 12.0% which marginally increased to 12.2% in NFHS 5, thereby showing an upward trend in the prevalence of APOs. State / UT wise, we see a wider variation in the prevalence of APOs both in NFHS 4 & NFHS 5. As per NFHS 4, 14 states or UTs out of a total of 36 states / UTs had an APO

prevalence of more than the national average. In comparison, NFHS 5 portrays a slight deterioration even at the state / UT level. As per NFHS 5, 16 out of 36 states / UTs have an APO prevalence of more than the national average. NFHS 5 also shows an increasing trend of APO prevalence in 20 states / UTs as compared to NFHS 4, while the remaining 16 states / UTs have experienced an improvement in the prevalence of APOs in NFHS 5 vis-à-vis NFHS 4.
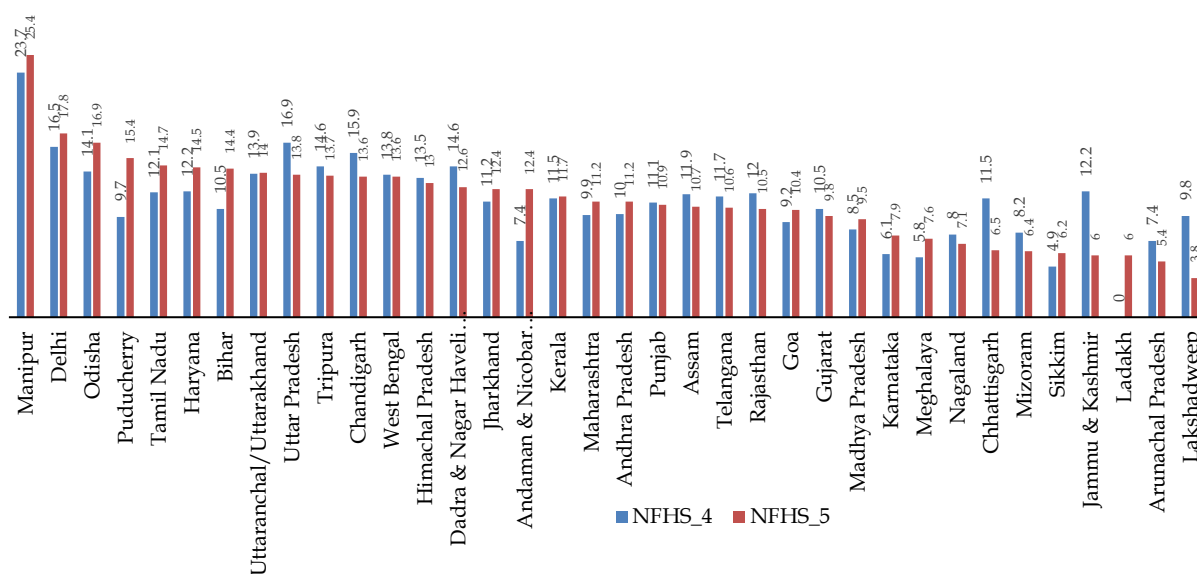

Figure 4 State-wise Prevalence of APOs as per NFHS 4 vs NFHS 5: A Comparative Picture

Table 1 Prevalence of APOs by selected socio-demographic characteristics of women of reproductive age 15-49 years in India, 2019-21

Selected Variables	Categories	APOs (n, %)	Chi-square	p-Value
Mother's age	15-19	284 (6.3)	349.262	< 0.001
	20-24	5011 (11.0)		
	25-29	6945 (11.0)		
	30-34	3058 (9.2)		
	35 and above	1240 (7.3)		
Mother's education	No education	2569 (8.1)	185.788	< 0.001
	Primary	2009 (10.1)		
	Secondary	9259 (10.7)		
	Higher	2701 (10.9)		
Partner's education	No education	274 (8.0)	23.244	< 0.001
	Primary	313 (10.2)		
	Secondary	1488 (10.5)		
	Higher	470 (11.1)		
Religion	Hindu	12972 (10.7)	155.111	< 0.001
	Muslim	2064 (8.9)		
	Others	1502 (8.2)		
Caste	SC/ST	5815 (9.1)	177.596	< 0.001
	OBC	6861 (11.0)		
	Other	3252 (11.5)		
Region	North	3464 (10.9)	217.966	< 0.001
	Central	4380 (10.8)		
	East	3356 (11.2)		
	Northeast	1939 (8.1)		
	west	1340 (8.8)		
	South	2059 (9.4)		
Wealth Index	Poor	6980 (9.1)	184.623	< 0.001
	Middle	3505 10.8)		
	Rich	6053 (11.3)		
Type of place of residence	Urban	3920 (11.2)	52.636	< 0.001
	Rural	12618 (9.8)		
BMI	Under weight	2827 (9.9)	71.078	< 0.001
	Normal	9762 (9.8)		
	Over weight	3928 (11.3)		
ANC visits	<4 ANC visit	6365 (9.6)	36.598	< 0.001
	>=4 ANC visit	10173 (10.5)		
Place of delivery	At home	1612 (9.3)	309.519	< 0.001
	Public	10247 (9.4)		
	Private	4679 (12.5)		
Transport used by respondent to go to health facility for delivery	By Ambulance	4344 (9.0)	110.373	< 0.001
	By Vehicle	10030 (10.8)		
	By Foot/Cart/Other	552 (10.7)		
Wanted pregnancy when became pregnant	No	574 (10.2)	0.042	0.837
	Yes	15964 (10.1)		
Covered by health insurance	No	12371 (10.5)	73.475	< 0.001
	Yes	4167 (9.1)		
Currently smokes or uses tobacco	No	15516 10.1)	5.259	0.022
	Yes	1022 (10.8)		
Birth order	1 born	6426 (11.5)	307.076	< 0.001
	2-3 born	8499 (9.9)		
	4 and more born	1613 (7.4)		
Mother's anemia level	Severe	413 (11.2)	7.007	<0.05
	Moderate/Mild	9090 (10.3)		
	Not Anemic	6513 (10.0)		
Hemoglobin level	Normal	5844 (9.8)	27.025	< 0.001
	Low	10099 (10.4)		
	High	356 (8.5)		
Told about pregnancy complications	No	3886 (11.6)	87.612	< 0.001
	Yes	12097 (9.9)		

Prevalence of APOs by selected socio-demographic characteristics of women of reproductive age

Table 1, the results of various demographic, socioeconomic, and maternal factors associated with the occurrence of APOs. This finding indicates that the occurrence of APOs and maternal age groups is statistically significant with *p* -value < 0.001. The prevalence of APOs was non-educated educated women (8.1%) and it slightly goes up if we move from mothers having no education to primary education (10.1%), secondary education (10.7%), and found higher in mothers having secondary education (10.9%). The prevalence of APOs was higher at about 11.5% in another category (general category) as compared to the SC/ST community and other backward classes (OBC). A higher prevalence of APOs was detected in the eastern part (11.2%) of the nation followed by the north (10.9%) and central (10.8%). The prevalence of APOs was higher among overweight and obese women about 11.3% as compared to underweight and normal BMI women (*p*-value < 0.001). More than four ANC visits were documented with a slightly higher prevalence (10.5%) of APOs among women than those who have consulted less than four ANC visits (9.6%) during every trimester. A higher prevalence of APOs was observed in private sector health facilities (12.5%) compared to public sector health facilities (9.4%) and at home (9.3%). This study also reveals the prevalence of APOs was higher among those women who have severe anemia levels (11.2%) compared to those who have mild/moderate and no anemia (*p*-value < 0.05). Similarly, women who have low hemoglobin levels (10.4%) and have pregnancy complications are statistically significant (*p*-value < 0.001). This study also explores all the selected variables such as place of residence, partner's education level, caste, religion, covered by health insurance, transport used by the respondent to go to a health facility for delivery (*p*-value < 0.001), and currently smokes or uses tobacco (*p*-value < 0.05) are also statistically significant in APOs among women of reproductive age.

Results of binary logistic regression of APOs by selected socio-demographic variables of women of reproductive age 15-49 years in India, 2019-2021 (Response variable: APOs)

In Table 2, a bivariate analysis was carried out to show the distribution of APOs with selected variables. The socio-demographic and maternal-related variables such as maternal age, maternal education level, caste, religion, type of place of residence, wealth index, maternal bad behavioral habits, birth order, ANC visits, BMI, maternal anemia level, knowledge about pregnancy complications are found to be statistically significant associated with APOs (*p*-value<0.05). The results of binary logistic regression revealed that women aged (25-29) were highly responsible (OR=1.902; 95% CI: 1.664-2.173) for APOs. Women having primary education were at higher risk for APOs (OR=1.229; 95% CI: 1.150-1.313) as compared to those who had no education. The risk of APOs was 9% lower among women who were residing in rural areas (OR=0.919; 95% CI: 0.879-0.961) as compared to their urban counterparts. The risk of APOs was higher in rich-class women as compared to middle and poor-class women. The odds of APOs were less among women who had mild/moderate (OR=0.854; 95% CI: 0.766-0.954) and no anemia (OR=0.825; 95% CI:0.739-0.922) level as compared to those who had suffered from severe levels of anemia. Overweight women (OR=1.190; 95% CI: 1.123-1.261) were more likely to experience APOs than underweight and normal. The odds of APOs were higher in the Hindu religion as compared to Muslims and others. The odds of APOs were higher among women who belong to the eastern part (OR=1.476; 95% CI: 1.384-1.575) of the nation as compared to other region of the nation. Higher odds of APOs were found in women belonging to other categories (general category) (OR=1.183; 95% CI: 1.123-1.246) as compared to OBC and SC/ST women. This study also reveals that the risk of APOs was higher among women who have visited more than 4 ANC visits (OR=1.060; 95% CI: 1.022-1.100) as compared to less than 4 ANC visits. Similarly, women having substance abuse (smoking and tobacco consumption) had a higher odds ratio (OR=1.375; 95% CI: 1.273-1.486) as

compared to women having no substance abuse during their pregnancy.

Discussion

Our study explored the prevalence of APOs among registered pregnant women (married) who had experienced 10.13% of APOs on their last pregnancy outcome. The results obtained from our analysis indicated that the factors like mother's age group, mother's educational level, partner's education level, type of residence, wealth status, region, religion, caste, BMI, mother anemia level, and ANC visits, place of delivery, transport used by the respondent for delivery, covered by health insurance, birth order, mother's hemoglobin level, and mother's pregnancy complication found to be significantly impacting APOs in India for the study period under consideration. Our findings displayed that all the selected factors of the mother have a statistically significant relationship with APOs.

Table 2 Results of binary logistic regression of APOs by selected socio-demographic variables of women of reproductive age 15-49 years in India, 2019-2021 (Response variable: APOs).

Selected Variables	Variables categories	B	S.E.	p-value	(OR)	95% C.I. Lower	95% C.I. Upper
Mother's age group	15-19	Ref.					
	20-24	0.573	0.067	< 0.001	1.774	1.555	2.024
	25-29	0.643	0.068	< 0.001	1.902	1.664	2.173
	30-34	0.494	0.071	< 0.001	1.638	1.426	1.882
	35 and above	0.318	0.076	< 0.001	1.375	1.185	1.595
Mother's educational level	No education	Ref.					
	Primary	0.206	0.034	<0.001	1.229	1.15	1.313
	Secondary	0.19	0.028	<0.001	1.21	1.146	1.277
	Higher	0.074	0.036	<0.001	1.076	1.003	1.155
Religion	Hindu	Ref.					
	Muslim	-0.181	0.03	<0.001	0.834	0.787	0.885
	Others	-0.158	0.036	< 0.001	0.854	0.796	0.916
Caste	SC/ST	Ref.					
	OBC	0.147	0.021	< 0.001	1.158	1.111	1.207
	Other	0.168	0.027	< 0.001	1.183	1.123	1.246
Region	South	Ref.					
	North	0.233	0.032	< 0.001	1.263	1.186	1.345
	Central	0.297	0.031	< 0.001	1.346	1.268	1.43
	East	0.39	0.033	< 0.001	1.476	1.384	1.575
	Northeast	0.088	0.042	< 0.05	1.092	1.007	1.185
	West	-0.061	0.039	0.122	0.941	0.871	1.016
Wealth index	Rich	Ref.					
	Poor	-0.159	0.026	<0.001	0.853	0.81	0.897
	Middle	-0.002	0.026	0.923	0.998	0.949	1.049
Type of place of residence	Urban	Ref.					
	Rural	-0.084	0.023	<0.001	0.919	0.879	0.961
Body mass index	Under weight	Ref.					
	Normal	-0.014	0.024	0.569	0.986	0.941	1.034
	Over weight	0.174	0.03	<0.001	1.19	1.123	1.261
ANC visits	< 4 ANC visit	Ref.					
	>=4 ANC visit	0.059	0.019	< 0.01	1.06	1.022	1.1
Currently smokes or uses tobacco	No	Ref.					
	Yes	0.319	0.039	<0.001	1.375	1.273	1.486
Birth order	4 and more born	Ref.					
	1 born	0.342	0.037	<0.001	1.407	1.31	1.512
	2-3 born	0.158	0.033	<0.001	1.171	1.098	1.249
Mother's anaemia level	Severe	Ref.					
	Moderate/Mild	-0.157	0.056	<0.005	0.854	0.766	0.954
	Not Anaemic	-0.192	0.057	<0.001	0.825	0.739	0.922
Pregnancy complications	No	Ref.					
	Yes	-0.221	0.021	<0.001	0.801	0.77	0.834
Constant		-2.918	0.103	<0.001	0.054		

Earlier studies show that women aged (35 and above) have a higher risk of APOs and other pregnancy complications (Patel et al. 2021; Swain et al. 2021; Lawn et al. 2016) and we found a difference in the mother's age (25-29) group which was more likely to experience APO. With reference to the level of education as a causal factor for experiencing APOs, it has been found that women with primary education or with secondary education had higher odds of experiencing APOs. Similar results were also highlighted by Yogi et al. 2018.

The current study also shows a statistically significant relationship between the wealth index of mothers and APOs. Women from rich families have a higher risk of APOs compared to poor women mainly because of factors like a sedentary lifestyle and higher age of pregnancy which increases higher risk of APOs. Poor women on the other hand live a physically active life which keeps their body away from various health hazards like diabetes, hypertension, etc. Moreover, rich women have the wherewithal to go for selective birth control measures such as abortion, which poor women lack. A study by Patel et al. 2021 and Dandona et al. 2017 have also supported these findings. The risk of APOs was higher among women who were residing in urban areas as compared to rural areas. Patel et al. 2021 have also highlighted the similar results in their study. Although health facilities in urban areas are widely available, women living in underprivileged urban areas are less likely to receive maternal health services, and as a result, they face pregnancy-related complications (Islam & Sultana 2019). The results indicate that place of delivery is a significant factor that stimulates' the APOs. It is observed that women opting for private healthcare facilities are more likely to have APOs. This finding explains one of the studies indicates that an absence or the human power crisis and lack of basic health facilities in the Government healthcare system results in the private sector being the major player in healthcare service delivery (Kasthuri 2018).

This study also revealed that the high risk of APOs was found in the eastern part of India compared to other regions. The risk of APOs was

higher in the Hindu religion as compared to Muslims and others. However, the gestational age of women's enrolment is higher in the Hindu religion as compared to other religious groups. This study exposed those mothers who had 4 or more than 4 ANC visits had a slightly higher risk of APOs as compared to had less than 4 ANC visits. Previous studies have also found a significant association between birth order and utilization of health care services (Srivastava et al. 2014; Wang & Hong 2015; Woldeamanuel & Belachew 2021). Receiving maternal health care services or more than 4 ANC visits had been found higher among women in their single birth order may be because of a perceived risk associated with the first pregnancy. The present study revealed that women with four or more birth orders have a lower likelihood of APOs. The reason behind the lower risk of APOs among women with four or more birth orders may have to do with a woman's repeated exposure to the process, risk factors, and remedial measures associated with pregnancy, and the experience gained in the process. A closer look at significant causal factors reveals that those women who had bad habits like smoking or tobacco consumption were more likely to experience APOs. Various studies have also identified that the association of smoking or tobacco consumption during pregnancy with APOs is due to various obstetric factors, and the risk was shown to increase with the amount of smoke (Ratnasiri et al. 2019; Doke et al. 2021). Our study found that higher risk of APOs among women with higher maternal BMI as compared to another level of BMI among mothers. Many empirical studies have also found that higher maternal BMI is linked with an increased risk of anovulation, pregnancy loss, and diminished pregnancy, low live birth rates in women (Incedal Irgat & Bakirhan 2022), prolonged pregnancy and increased rate of induction of labor, cesarean section, pre-term labor and macrosomia (Yazdani et al. 2012; Ovesen & Kesmodel 2011; Yu et al. 2006). Severe anemia level, a medical complication of the mother during pregnancy is significantly associated with the increasing high risk of APOs. This is corporate with several studies showing

the same finding on a mother's anemia level and increasing risk of pregnancy complications (Patel et al. 202; Swain et al. 202; Dandona et al. 2017). To reduce maternal mortality and pregnancy-related problems and to improve the quality of birth outcomes, the government has put in place several initiatives and regulations. Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) is one of those policies and programs that guarantee high-risk pregnancy detection and quality antenatal care. As a result, pregnant women may become aware of their precarious situation through PMSMA and consult doctors frequently to discuss pregnancy complications and attempt to avoid unfavourable pregnancy outcomes. This may result in a decreased risk of APOs in pregnant women experiencing difficulties.

The government has implemented several programs and policies to prevent maternal mortality pregnancy-related complications and birth outcomes. Those policies are *Janani Shishu Suraksha Karyakram (JSSK)* entitles all pregnant women delivering in public health institutions to absolutely free and no-expense delivery including caesarean delivery, *Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)* ensures quality antenatal care and high-risk pregnancy detection*, LaQshya* provides labor room quality improvement initiative to decline in MMR. Despite these efforts, adverse pregnancy outcomes remain a significant public health challenge, that needs to be addressed carefully. The health sector, policymakers, and civil society must work collaboratively to address the underlying causes of APOs and devise sustainable solutions to improve health outcomes.

Conclusion

As per the WHO and United Nations report, this study also revealed that a high prevalence of APOs was found in India. It is very important to understand the relationship between mothers' pregnancy-related complications and their impact on the fetus as the health of the newborn and survival are closely linked to the health of the mother before and during pregnancy, as well as during labor, childbirth, and the postpartum period.

Although the government has implemented various schemes, the anomaly is that improvement in women's and children's health outcomes is not balanced across the states. These programs should be broadened to address the health status of married adolescents. Therefore, it is natural to believe that policymakers across the world in their respective domains have been policy injecting to ensure favourable health outcomes for their population. The amount of success that has been achieved over time may vary from region to region or county to county or even within a country, but the realization of the problem and the interest has been positive and encouraging.

In conclusion, this study suggests the need for further research that explores the influences on young women's pregnancy decision-making regarding socioeconomic circumstances, ethnicity, age, gender, maternal factors, and pregnancy-specific complications. For more useful inputs future research may consider relying on longitudinal study.

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Data reference: The DHS program. India: Standard DHS, 2019-21. https://dhsprogram.com/data/dataset/India_Standard-DHS_2020.cfm?flag=1

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