Preplanned Studies

Changes in Maternal Socio-Demographic Characteristics and Pregnancy Outcomes Across Monitoring Regions — Six Provinces, China, 2016–2022

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Summary

What is already known about this topic?

In recent years, there has been a significant increase in the proportion of women of advanced maternal age (AMA), accompanied by a rise in adverse pregnancy outcomes in certain regions of China.

What is added by this report?

From 2016 to 2022, there was an observed increase in the proportion of AMA, educational levels, and incidences of preterm birth and low birth weight (LBW) in both primiparous and multiparous women. Concurrently, there was a declining trend in the rate of cesarean deliveries and the incidence of macrosomia among multiparous women.

What are the implications for public health practice?

In addition to focusing on health management for AMA individuals, proactive steps should be undertaken to enhance the quality of medical services and promote childbirth at optimal ages, thereby reducing the incidence of adverse pregnancy outcomes.

In recent years, China has faced significant challenges due to a declining fertility rate, an aging population, and an unbalanced demographic structure. Concurrently, there have been shifts in maternal characteristics and pregnancy outcomes. While existing research predominantly focuses on maternal age and pregnancy results and often only within specific provinces (*1–4*), there remains a lack of comprehensive understanding of socio-demographic traits across various regions. This retrospective study examines maternal data from monitoring sites across China from 2016 to 2022, providing a systematic evaluation of the changes in maternal socio-demographic characteristics and perinatal outcomes. The findings reveal that from 2016 to 2022, there was an increase in the number of advanced maternal age (AMA) mothers, educational attainment, and instances of preterm birth and low birth weight (LBW) among both primiparous and multiparous mothers. Conversely, the rates of cesarean delivery and macrosomia among multiparous mothers showed a declining trend. These trends underscore the need for targeted healthcare improvements and policies encouraging childbirth at optimal ages to mitigate adverse pregnancy outcomes.

Data for this study were obtained from the Maternal and Newborn Health Monitoring System (MNHMS), established by the National Center for Women and Children's Health (NCWCH) in 2013. The cohort comprised all pregnant women who were either resident or had resided for more than six months in the designated monitoring areas and were enrolled during their initial antenatal care (ANC) visit. Data, including ANC visits throughout pregnancy and delivery, were captured and maintained in the MNHMS. To ensure data continuity and integrity, this study analyzed maternal case data from 6 provinces monitored from January 1, 2016, to December 31, 2022. The regions covered included Fujian Province (Haicang and Jimei districts) and Guangdong Province (Zijin and Longchuan counties) in the eastern region, Hebei Province (Zhengding County) and Hubei Province (Luotian County) in the central region, and Sichuan Province (Gongjing District and Rong County) and Yunnan Province (Tonghai and Huaning counties) in the western region. Inclusion criteria were: 1) delivery occurred between January 1, 2016 and December 31, 2022; 2) singleton pregnancies; and 3) live birth. Exclusion criteria included: 1) missing last menstrual period (LMP) or delivery dates; 2) availability of only prenatal examination records or absence of delivery records. Ultimately, 253,389 pregnant women and their infants were included in the analysis. The Maternal and Newborn Health Monitoring Program (MNHMP) data collection was approved by the Ethics Committee of the National Center for Women and Children's Health, China CDC (No. FY2015–007), and underwent annual ethical reviews (Nos. FY2018-

14, FY2019-12, FY2021-13, FY2022-11). Additionally, the use of data in this study was also approved by this committee (No. FY2024-12).

In this study, women residing in the district were categorized as urban residents, while those living in the county were classified as rural residents. Preterm delivery was defined as childbirth occurring between 28 and less than 37 weeks of gestation, and LBW was defined as a birth weight below 2,500 g. The dataset was imported from Excel into SAS software (version 9.4, SAS Institute, Cary, NC, USA) for data cleaning. The χ^2 test was employed to evaluate differences between primiparas (first-time mothers) and multiparas (mothers with one or more previous births). The trend χ^2 test was utilized for univariate analysis to assess trends in maternal age, literacy, preterm birth, LBW, and macrosomia incidence annually.

In the monitored regions, the majority of mothers were aged between 18 and 34 years (88.9%). The proportion of women aged 35 years or older was significantly higher among multiparas (16.0%) compared to primiparas (3.9%). Educational attainment differed between the groups; 43.6% of primiparas had at least a college degree, and 30.9% had completed high school or vocational training. In contrast, the largest segment of multiparas had reached junior high school education (39.5%). Vaginal delivery was the predominant mode of delivery for both primiparas (63.8%) and multiparas (61.4%). The rates of preterm birth and macmultiparas (mothers with one or more previous births). The trend thers, whereas primiparous mothers experienced a significantly higher incidence of LBW compared to multipar test was utilized for univariate analysis to assess trends in maternal age, literacy, preterm birth, LBW, and macrosomia incidence annually (Table 1).

From 2016 to 2022, there was a significant increase in the proportion of AMA among both primiparas and multiparas, with all P<0.01. Specifically, the rise in the proportion of advanced age among multiparas (6.8%) was significantly greater than that among primiparas (2.4%). By 2022, the share of advanced-age multiparas peaked at 19.7%. Over the same period, the proportions of both primiparas and multiparas in eastern areas showed a consistent annual increase (χ^2_{trend}=4,625.873, P<0.01 and χ^2_{trend}=4,912.240, P<0.01, respectively). Additionally, from 2016 to 2022, there was a rising trend in the proportion of individuals with a college degree or higher among both primiparas and multiparas (χ^2_{trend}=2,757.522, P < 0.01 and χ^2_{trend}=1,896.743, P<0.01, respectively). From 2018 to 2022, the predominant educational level among primiparas was college or above. Among multiparas, although the predominant educational level was junior high school from 2016 to 2020, the proportion with college degrees or higher grew to become the majority by 2021 (38.1%) and further increased in 2022 (41.4%).

From 2016 to 2022, the distribution of delivery methods among primiparas remained largely unchanged. However, there was a notable decrease in the proportion of cesarean sections among multiparas (χ^2_{trend}=16.358, P<0.01). During the same period, the incidence of adverse pregnancy outcomes such as preterm birth and LBW increased among both primiparas and multiparas (all P<0.01). Conversely, the incidence of macrosomia in multiparas showed a declining trend (χ^2_{trend}=8.231, P<0.01) (Table 2).

DISCUSSION

This study is a retrospective cohort investigation spanning several years, encompassing various provinces and regions across China. It specifically focused on all pregnant women present at the study sites throughout the duration of the study. The findings indicate that between 2016 and 2022, the proportion of AMA among both multiparas and primiparas has been increasing, with a notably higher proportion observed in multiparas compared to primiparas. These findings are largely in agreement with prior research conducted in Zhejiang (*1*) and Hebei (*2*). The rise in AMA among primiparas can likely be attributed to delayed childbirth, driven by socio-economic advancements and subsequent postponements in marriage and first-time childbearing (*5*). Additionally, during this period, revisions in fertility policy potentially facilitated the realization of deferred reproductive intentions among older women, contributing to the observed increase in AMA among multiparas. From 2016 to 2022, the proportion of both primiparas and multiparas in the eastern region of China showed a yearly increase. This trend could be influenced by the region's economic growth, which fosters fertility; however, this effect varies across regions and is influenced by differing levels of economic development (*6*). As the eastern region offers higher living standards, better social security, and medical facilities, coupled with more favorable fertility policies, it attracts more women to conceive and have additional children.

The results indicated that the educational level

TABLE 1. Maternal socio-demographic characteristics and pregnancy outcomes in 6 provinces, China, 2016–2022.

Variable	Total *n* (%; 95% *CI*)	Primiparas *n* (%; 95% *CI*)	Multiparas *n* (%; 95% *CI*)	*P*
Age (years)				
<18	1,168 (0.5; 0.4, 0.5)	1,087 (1.0; 0.9, 1.0)	81 (0.1; 0.1, 0.1)	< 0.001
18–34	225,272 (88.9; 88.8, 89.0)	107,582 (95.1; 95.0, 95.2)	117,690 (83.9; 83.7, 84.1)	< 0.001
≥35	26,949 (10.6; 10.5, 10.8)	4,456 (3.9; 3.8, 4.1)	22,493 (16.0; 15.9, 16.2)	<0.001
Residence				
Urban	92,236 (36.4; 36.2, 36.6)	37,345 (33.0; 32.7, 33.3)	54,891 (39.1; 38.9, 39.4)	<0.001
Rural	161,153 (63.6; 63.4, 63.8)	75,780 (67.0; 66.7, 67.3)	85,373 (60.9; 60.6, 61.1)	
Region				
Eastern	142,992 (56.4; 56.2, 56.6)	55,352 (48.9; 48.6, 49.2)	87,640 (62.5; 62.2, 62.7)	< 0.001
Central	58,362 (23.0; 22.9, 23.2)	34,427 (30.4; 30.1, 30.7)	23,935 (17.1; 16.9, 17.3)	< 0.001
Western	52,035 (20.5; 20.4, 20.7)	23,346 (20.6; 20.4, 20.9)	28,689 (20.5; 20.2, 20.7)	0.255
Educational level				
Primary school or lower	8,635 (3.4; 3.3, 3.5)	2,383 (2.1; 2.0, 2.2)	6,252 (4.5; 4.4, 4.6)	< 0.001
Junior high school	81,837 (32.3; 32.1, 32.5)	26,481 (23.4; 23.2, 23.7)	55,356 (39.5; 39.2, 39.7)	<0.001
Senior high school/vocational training	68,935 (27.2; 27.0, 27.4)	34,942 (30.9; 30.6, 31.2)	33,993 (24.2; 24.0, 24.5)	<0.001
College or above	93,982 (37.1; 37.0, 37.3)	49,319 (43.6; 43.3, 43.9)	44,663 (31.8; 31.6, 32.1)	<0.001
Delivery mode				
Vaginal delivery	158,340 (62.5; 62.3, 62.7)	72,173 (63.8; 63.5, 64.1)	86,167 (61.4; 61.2, 61.7)	<0.001
Cesarean section	95,049 (37.5; 37.3, 37.7)	40,952 (36.2; 35.9, 36.5)	54,097 (38.6; 38.3, 38.8)	
Preterm delivery				
Yes	11,609 (4.6; 4.5, 4.7)	4,763 (4.2; 4.1, 4.3)	6,846 (4.9; 4.8, 5.0)	<0.001
No	241,780 (95.4; 95.3, 95.5)	108,362 (95.8; 95.7, 95.9)	133,418 (95.1; 95.0, 95.2)	
Low birth weight				
Yes	9,703 (3.8; 3.8, 3.9)	4,776 (4.2; 4.1, 4.3)	4,927 (3.5; 3.4, 3.6)	<0.001
No	243,686 (96.2; 96.1, 96.2)	108,349 (95.8; 95.7, 96.0)	135,337 (96.5; 96.4, 96.6)	
Macrosomia				
Yes	8,442 (3.3; 3.3, 3.4)	3,368 (3.0; 2.9, 3.1)	5,074 (3.6; 3.5, 3.7)	<0.001
No	244,947 (96.7; 96.6, 96.7)	109,757 (97.0; 96.9, 97.1)	135,190 (96.4; 96.3, 96.5)	
Total	253,389 (100.0)	113,125 (100.0)	140,264 (100.0)	

among both primiparas and multiparas has progressively improved, aligning with findings from other studies (*7*). Furthermore, this study revealed a significant shift in the predominant educational attainment of multiparas from junior high school to college or above in recent years. This trend may be attributed to the overall enhancement of societal educational standards. According to the statistical monitoring report from the "Development Outline for Chinese Women," the number of female students in higher education rose by 1.225 million from 2021, reaching 29.033 million in 2022 (*8*). Additionally, the link between higher fertility rates and advanced education underscores that individuals with higher educational levels often possess higher incomes, more stable employment, and better salaries, which collectively facilitate the financial means necessary for child-rearing. Chen (*9*) investigated the causal impact of women's educational level on fertility and found that a higher educational level increases women's desire for children.

In this study, we observed a decrease in the rate of cesarean sections among multiparous women. This may be attributed to a growing preference among women in recent years to have two or more children, leading them to opt for vaginal delivery during their first childbirth. This choice appears to reduce the prevalence of scarred uteri among multiparas,

TABLE 2. Univariate analysis of primiparous and multiparous individuals across 6 PLADs in China, 2016–2022 [*n* (%, 95% *CI*)].

Variable	Primiparas								Multiparas							
	2016	2017	2018	2019	2020	2021	2022	*P*	2016	2017	2018	2019	2020	2021	2022	*P*
Age (years old)																
<18	209 (1.1; 0.9, 1.2)	182 (1.1; 1.0, 1.3)	192 (1.1; 1.0, 1.3)	175 (1.0; 0.8, 1.1)	138 (0.9; 0.7, 1.1)	117 (0.8; 0.7, 1.0)	74 (0.6; 0.5, 0.8)	0.001	9 (0.0; 0.0, 0.1)	15 (0.1; 0.0, 0.1)	20 (0.1; 0.1, 0.1)	10 (0.0; 0.0, 0.1)	11 (0.1; 0.0, 0.1)	7 (0.0; 0.0, 0.1)	9 (0.1; 0.0, 0.1)	0.701
18–34	18819 (96.1; 95.8, 96.3)	15,802 (95.3 95.0, 95.6)	16,554 (95.0; 94.7, 95.3)	17,438 (95.2; 94.8, 95.5)	14,406 (94.8; 94.4, 95.1)	13,184 (94.5 94.2, 95.0)	11,379 (94.2; 93.8, 94.6)	<0.001	17,239 (87.1; 86.6, 87.5)	17,264 (83.7; 83.2, 84.2)	18,871 (83.7; 83.2, 84.2)	20,387 (85.0; 84.5, 85.4)	17,171 (83.5; 83.0, 84.1)	14,805 (82.9; 82.3, 83.4)	11,953 (80.2; 79.6, 80.9)	<0.001
≥35	549 (2.8; 2.6, 3.0)	592 (3.6; 3.3, 3.9)	675 (3.9; 3.6, 4.2)	711 (3.9; 3.6, 4.2)	658 (4.3; 4.0, 4.7)	644 (4.6; 4.3, 5.0)	627 (5.2; 4.8, 5.6)	<0.001	2,548 (12.9; 12.4, 13.3)	3,354 (16.3; 15.8, 16.8)	3,646 (16.2; 15.7, 16.7)	3,590 (15.0; 14.5, 15.4)	3,370 (16.4; 15.9, 16.9)	3,052 (17.1; 16.5, 17.6)	2,933 (19.7; 19.1, 20.3)	<0.001
Residence																
Urban	5,585 (28.5; 27.9, 29.2)	2,710 (16.3; 15.8, 16.9)	5,803 (33.3; 32.6, 34.0)	6,656 (36.3; 35.6, 37.0)	6,018 (39.6; 38.8, 40.4)	5,558 (39.9; 39.0, 40.7)	5,015 (41.5; 40.6, 42.4)	<0.001	7,183 (36.3; 35.6, 37.0)	4,877 (23.6; 23.1, 24.2)	9,706 (43.1; 42.4, 43.7)	10,027 (41.8; 41.2, 42.4)	9,196 (44.7; 44.1, 45.2)	7,661 (42.9; 42.2, 43.6)	6,241 (41.9; 41.1, 42.7)	<0.001
Rural	13,992 (71.5; 70.8, 72.1)	13,866 (83.7; 83.1, 84.2)	11,618 (66.7; 66.0, 67.4)	11,668 (63.7; 63.0, 64.4)	9,184 (60.4; 59.6, 61.2)	8,387 (60.1; 59.3, 61.0)	7,065 (58.5; 57.6, 59.4)		12,613 (63.7; 63.0, 64.4)	15,756 (76.4; 75.8, 76.9)	12,831 (56.9; 56.3, 57.6)	13,960 (58.2; 57.6, 58.8)	11,356 (55.3; 54.6, 55.9)	10,203 (57.1; 56.4, 57.8)	8,654 (58.1; 57.3, 58.9)	<0.001
Region																
Eastern	6,688 (34.2; 33.5, 34.8)	5,695 (34.4; 33.6, 35.1)	8,361 (48.0; 47.2, 48.7)	10,076 (55.0; 54.3, 55.7)	8,865 (58.3; 57.5, 59.1)	8,378 (60.1; 59.3, 61.0)	7,289 (60.3; 59.5, 61.2)	<0.001	9,082 (45.9; 45.2, 46.6)	10,325 (50.0; 49.4, 50.7)	14,016 (62.2; 61.6, 62.8)	16,308 (68.0; 67.4, 68.6)	14,443 (70.3; 69.6, 70.9)	12,683 (71.0; 70.3, 71.7)	10,783 (72.4; 71.7, 73.1)	<0.001
Central	7,174 (36.6; 36.0, 37.3)	6,677 (40.3; 39.5, 41.0)	5,683 (32.6; 31.9, 33.3)	5,201 (28.4; 27.7, 29.0)	3,819 (25.1; 24.4, 25.8)	3,169 (22.7; 22.0, 23.4)	2,704 (22.4; 21.6, 23.1)	<0.001	5,323 (26.9; 26.3, 27.5)	4,674 (22.7; 22.1, 23.2)	3,764 (16.7; 16.2, 17.2)	3,540 (14.8; 14.3, 15.2)	2,603 (12.7; 12.2, 13.1)	2,291 (12.8; 12.3, 13.3)	1,740 (11.7; 11.2, 12.2)	<0.001
Western	5,715 (29.2; 28.6, 29.8)	4,204 (25.4; 24.7, 26.0)	3,377 (19.4; 18.8, 20.0)	3,047 (16.6; 16.1, 17.2)	2,518 (16.6; 16.0, 17.2)	2,398 (17.2; 16.6, 17.8)	2,087 (17.3; 16.6, 18.0)	<0.001	5,391 (27.2; 26.6, 27.9)	5,634 (27.3; 26.7, 27.9)	4,757 (21.1; 20.6, 21.6)	4,139 (17.3; 16.8, 17.7)	3,506 (17.1; 16.5, 17.6)	2,890 (16.2; 15.6, 16.7)	2,372 (15.9; 15.3, 16.5)	<0.001
Educational level																
Primary school or lower	467 (2.4; 2.2, 2.6)	340 (2.1; 1.8, 2.3)	332 (1.9; 1.7, 2.1)	255 (1.4; 1.2, 1.6)	236 (1.6; 1.4, 1.8)	565 (4.1; 3.7, 4.4)	188 (1.6; 1.3, 1.8)	0.116	1,315 (6.6; 6.3, 7.0)	1,089 (5.3; 5.0, 5.6)	1,074 (4.8; 4.5, 5.1)	869 (3.6; 3.4, 3.9)	793 (3.9; 3.6, 4.1)	639 (3.6; 3.3, 3.9)	473 (3.2; 2.9, 3.5)	<0.001
Junior high school	4,856 (24.8; 24.2, 25.4)	4,621 (27.9; 27.2, 28.6)	4,407 (25.3; 24.7, 26.0)	4,414 (24.1; 23.5, 24.7)	3,397 (22.3; 21.7, 23.0)	2,690 (19.3; 18.6, 20.0)	2,096 (17.4; 16.7, 18.0)	<0.001	8,773 (44.3; 43.6, 45.0)	8,858 (42.9; 42.3, 43.6)	8,881 (39.4; 38.8, 40.0)	9,611 (40.1; 39.4, 40.7)	7,867 (38.3; 37.6, 38.9)	6,316 (35.4; 34.7, 36.1)	5,050 (33.9; 33.1, 34.7)	<0.001
Senior high school/vocational training	7,052 (36.0; 35.3, 36.7)	6,325 (38.2; 37.4, 38.9)	5,642 (32.4; 31.7, 33.1)	5,585 (30.5; 29.8, 31.2)	4,291 (28.2; 27.5, 28.9)	3,363 (24.1; 23.4, 24.8)	2,684 (22.2; 21.5, 23.0)	<0.001	5,085 (25.7; 25.1, 26.3)	5,212 (25.3; 24.7, 25.9)	5,632 (25.0; 24.4, 25.6)	5,874 (24.5; 23.9, 25.0)	4,879 (23.7; 23.2, 24.3)	4,105 (23.0; 22.4, 23.6)	3,206 (21.5; 20.9, 22.2)	<0.001
College or above	7,202 (36.8; 36.1, 37.5)	5,290 (31.9; 31.2, 32.6)	7,040 (40.4; 39.7, 41.1)	8,070 (44.0; 43.3, 44.8)	7,278 (47.9; 47.1, 48.7)	7,327 (52.5; 51.7, 53.4)	7,112 (58.9; 58.0, 59.8)	<0.001	4,623 (23.4; 22.8, 23.9)	5,474 (26.5; 25.9, 27.1)	6,950 (30.8; 30.2, 31.4)	7,633 (31.8; 31.2, 32.4)	7,013 (34.1; 33.5, 34.8)	6,804 (38.1; 37.4, 38.8)	6,166 (41.4; 40.6, 42.2)	<0.001

Continued

Variable	Primiparas								Multiparas							
	2016	2017	2018	2019	2020	2021	2022	*P*	2016	2017	2018	2019	2020	2021	2022	*P*
Delivery mode																
Vaginal delivery	12,737 (65.1; 64.4, 65.7)	10,383 (62.6; 61.9, 63.4)	11,124 (63.9; 63.1, 64.6)	12,061 (65.8; 65.1, 66.5)	9,529 (62.7; 61.9, 63.5)	8,844 (63.4; 62.6, 64.2)	7,495 (62.0; 61.2, 62.9)	<0.001	11,127 (56.2; 55.5, 56.9)	11,993 (58.1; 57.4, 58.8)	13,772 (61.1; 60.5, 61.7)	15,247 (63.6; 63.0, 64.2)	13,000 (63.3; 62.6, 63.9)	11,481 (64.3; 63.6, 65.0)	9,547 (64.1; 63.3, 64.9)	<0.001
Cesarean section	6,840 (34.9; 34.3, 35.6)	6,193 (37.4; 36.6, 38.1)	6,297 (36.1; 35.4, 36.9)	6,263 (34.2; 33.5, 34.9)	5,673 (37.3; 36.5, 38.1)	5,101 (36.6; 35.8, 37.4)	4,585 (38.0; 37.1, 38.8)	<0.001	8,669 (43.8; 43.1, 44.5)	8,640 (41.9; 41.2, 42.6)	8,765 (38.9; 38.3, 39.5)	8,740 (36.4; 35.8, 37.0)	7,552 (36.7; 36.1, 37.4)	6,383 (35.7; 35.0, 36.4)	5,348 (35.9; 35.1, 36.7)	<0.001
Preterm delivery																
Yes	732 (3.7; 3.5, 4.0)	612 (3.7; 3.4, 4.0)	726 (4.2; 3.9, 4.5)	753 (4.1; 3.8, 4.4)	714 (4.7; 4.4, 5.0)	662 (4.7; 4.4, 5.1)	564 (4.7; 4.3, 5.1)	<0.001	861 (4.3; 4.1, 4.6)	890 (4.3; 4.0, 4.6)	1,080 (4.8; 4.5, 5.1)	1,179 (4.9; 4.6, 5.2)	1,036 (5.0; 4.7, 5.3)	959 (5.4; 5.0, 5.8)	841 (5.6; 5.3, 6.0)	<0.001
No	18,845 (96.3; 96.0, 96.5)	15,964 (96.3; 96.0, 96.6)	16,695 (95.8; 95.5, 96.1)	17,571 (95.9; 95.6, 96.2)	14,488 (95.3; 95.0, 95.6)	13,283 (95.3; 94.9, 95.6)	11,516 (95.3; 94.9, 95.7)	<0.001	18,935 (95.7; 95.4, 95.9)	19,743 (95.7; 95.4, 96.0)	21,457 (95.2; 94.9, 95.5)	22,808 (95.1; 94.8, 95.4)	19,516 (95.0; 94.7, 95.3)	16,905 (94.6; 94.3, 95.0)	14,054 (94.4; 94.0, 94.7)	<0.001
Low birth weight																
Yes	730 (3.7; 3.5, 4.0)	641 (3.9; 3.6, 4.2)	718 (4.1; 3.8, 4.4)	762 (4.2; 3.9, 4.5)	683 (4.5; 4.2, 4.8)	662 (4.7; 4.4, 5.1)	580 (4.8; 4.4, 5.2)	<0.001	616 (3.1; 2.9, 3.4)	632 (3.1; 2.8, 3.3)	778 (3.5; 3.2, 3.7)	912 (3.8; 3.6, 4.1)	735 (3.6; 3.3, 3.8)	673 (3.8; 3.5, 4.1)	581 (3.9; 3.6, 4.2)	<0.001
No	18,847 (96.3; 96.0, 96.5)	15,935 (96.1; 95.8 , 96.4)	16,703 (95.9; 95.6, 96.2)	17,562 (95.8; 95.5, 96.1)	14,519 (95.5; 95.2, 95.8)	13,283 (95.3; 94.9, 95.6)	11,500 (95.2; 94.8, 95.6)	<0.001	19,180 (96.9; 96.6, 97.1)	20,001 (96.9; 96.7, 97.2)	21,759 (96.5; 96.3, 96.8)	23,075 (96.2; 96.0, 96.4)	19,817 (96.4; 96.2, 96.7)	17,191 (96.2; 95.9, 96.5)	14,314 (96.1; 95.8, 96.4)	<0.001
Macrosomia																
Yes	634 (3.2; 3.0, 3.5)	466 (2.8; 2.6, 3.1)	515 (3; 2.7, 3.2)	538 (2.9; 2.7, 3.2)	504 (3.3; 3.0, 3.6)	393 (2.8; 2.5, 3.1)	318 (2.6; 2.4, 2.9)	0.057	775 (3.9; 3.6, 4.2)	742 (3.6; 3.3, 3.9)	816 (3.6; 3.4, 3.9)	856 (3.6; 3.3, 3.8)	803 (3.9; 3.6, 4.2)	609 (3.4; 3.1, 3.7)	473 (3.2; 2.9, 3.5)	0.004
No	18,943 (96.8; 96.5, 97.0)	16,110 (97.2; 96.9, 97.4)	16,906 (97.0; 96.8, 97.3)	17,786 (97.1; 96.8, 97.3)	14,698 (96.7; 96.4, 97.0)	13,552 (97.2; 96.9, 97.5)	11,762 (97.4; 97.1, 97.6)	0.057	19,021 (96.1; 95.8, 96.4)	19,891 (96.4; 96.1, 96.7)	21,721 (96.4; 96.1, 96.6)	23,131 (96.4; 96.2, 96.7)	19,749 (96.1; 95.8, 96.4)	17,255 (96.6; 96.3, 96.9)	14,422 (96.8; 96.5, 97.1)	0.004
Total	19,577 (100.0)	16,576 (100.0)	17,421 (100.0)	18,324 (100.0)	15,202 (100.0)	13,945 (100.0)	12,080 (100.0)		19,796 (100.0)	20,633 (100.0)	22,537 (100.0)	23,987 (100.0)	20,552 (100.0)	17,864 (100.0)	14,895 (100.0)	

subsequently lowering their cesarean rates (*3*). Additionally, the findings revealed that the incidence of macrosomia was higher in multiparas compared to primiparas, potentially linked to a greater prevalence of gestational diabetes in multiparas, a condition known to elevate the risk of macrosomia. Between 2016 and 2022, there was a rising trend in the incidences of preterm birth and LBW among both primiparas and multiparas. This increase is likely related to higher maternal ages, which have been strongly associated with both preterm birth and LBW (*10*).

This study's strengths lie in its reliance on continuous, systematic data monitoring, a substantial sample size, and broad temporal scope, which collectively provide a detailed insight into evolving maternity patterns within the monitored regions.

However, the study is limited by its focus on just six provinces, restricting the applicability of its findings to the national level and suggesting a need for more geographically inclusive data. Furthermore, while this study has concentrated on preterm births, LBW, and macrosomia, future research should include a wider range of adverse outcomes to expand upon these findings.

In conclusion, between 2016 and 2022, there was a notable increase in the proportion of older mothers, along with a rise in the incidences of preterm births and LBWs, particularly among multiparas in the monitored regions. Consequently, it is vital for perinatal healthcare workers and obstetricians to enhance the management of pregnant women, particularly among AMA groups, and to improve the quality of medical services to mitigate the risk of adverse pregnancy outcomes. Additionally, measures should be implemented to encourage women to conceive at an optimal age to foster maternal and child health.

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