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Pregnancy and perinatal outcomes of ethnic minorities in a public hospital in Hong Kong

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Objectives: To evaluate the pregnancy and perinatal outcomes of ethnic minorities at a public hospital in Hong Kong.
Methods: Medical records of non-Chinese women (excluding Western women) with singleton pregnancies who delivered at ≥24 weeks of gestation between 1 January 2023 and 31 December 2023 at Kwong Wah Hospital were retrieved, as were those of Chinese women matched for parity and maternal age with the closest delivery dates. The two groups were compared using multivariable regression analyses to determine independent factors associated with adverse outcomes.
Results: In total, 218 ethnic minority women and 218 matched Chinese women were included. Non-Chinese women were more often unbooked, had higher body mass index, had lower haemoglobin levels at booking visits, and were more likely to have chronic hypertension and preeclampsia. However, non-Chinese women had lower intrapartum blood loss and a lower incidence of postpartum haemorrhage but higher rates of overall and emergency lower-segment Caesarean section. Non-Chinese women were more likely to undergo Caesarean section due to cephalopelvic disproportion, lack of progress, failed induction, or hypertensive disorders. A trend towards higher neonatal intensive care unit admission rates was observed among non-Chinese women.
Conclusion: Compared with Chinese women, non-Chinese women had higher rates of unbooked antenatal care, preeclampsia, and Caesarean section, as well as lower haemoglobin levels at booking visits, but lower rates of postpartum haemorrhage. Early recognition and close monitoring of risk factors are particularly important for ethnic minority women.

Keywords: Ethnic and racial minorities; Pre-eclampsia; Pregnancy outcome

Introduction

According to the 2021 Census of Hong Kong, there were approximately 600 000 non-Chinese ethnic minorities, representing 8.4% of the population[1]. Most were Filipinos and Indonesians, followed by South Asians (including Indians, Pakistanis, and Nepalese). Their monthly incomes were mostly <$10 000, which was lower than the median for the overall working population in Hong Kong[1], reflecting lower socioeconomic status. These ethnic minorities also had lower age-adjusted educational attainment than the general population in Hong Kong[1]. Although Western people are also classified as ethnic minorities in Hong Kong, they generally have higher incomes and educational attainment and experience fewer language barriers and less discrimination[1]. Therefore, Western peoples are commonly excluded from the definition of ethnic minorities when studying health inequities[1,2]. The World Health Organization framework on social determinants of health highlights health inequalities that arise from the conditions in which individuals are born, grow, live, work, and age[3]. In Hong Kong, ethnic minority women often face structural disadvantages, including language barriers, unstable employment, and lower educational attainment, which limit their access to timely and appropriate healthcare. These challenges and disparities in health-seeking behaviour may lead to adverse obstetric outcomes.

Racial and ethnic disparities lead to differences in maternal morbidity and mortality. For instance, in United Kingdom, Black and Asian women have threefold and twofold higher risks of maternal mortality, respectively, compared with White women[4]. Black women also have a higher risk of pregnancy complications, including pregnancy-induced hypertension, asthma, placental disorders, gestational diabetes mellitus, and maternal mortality[5]. However, the associations between maternal

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ethnicity and neonatal morbidity remain inconsistent. Some studies have revealed lower morbidity among neonates born to Black women, whereas others have shown the higher crude frequency of adverse perinatal outcomes in term neonates born to Black women[6-8]. In Hong Kong, data regarding the association between pregnancy and perinatal outcomes among ethnic minorities are limited.

The obstetric unit of Kwong Wah Hospital, Hong Kong, recorded 2463 live births in 2023[9]. Approximately 8.9% of these deliveries were among non-Chinese women. This study aimed to evaluate the pregnancy and perinatal outcomes of ethnic minorities at Kwong Wah Hospital. We hypothesised that ethnic minority mothers and neonates would have a higher risk of adverse outcomes compared with Chinese women[1].

Methods

Medical records of non-Chinese women (excluding Western women) with singleton pregnancies who delivered at ≥24 weeks of gestation between 1 January 2023 and 31 December 2023 at Kwong Wah Hospital were retrieved, as were those of matched Chinese women with the closest delivery dates. Matching was based on parity (nulliparous or multiparous) and maternal age (≥35 years or <35 years). This matched cohort design aimed to adjust for confounders such as maternal age and parity, which are known to influence obstetric outcomes.

Data collected included maternal characteristics (age, prepregnancy body mass index [BMI], booking status, parity, and pre-existing comorbidities), obstetric complications (hypertensive disease in pregnancy, gestational diabetes mellitus, antepartum haemorrhage, antepartum anaemia, postpartum haemorrhage [PPH], and maternal mortality), delivery details (type of labour, mode of delivery, gestational week, and birth weight), and composite adverse perinatal outcomes (low birth weight, low Apgar score of <4 at 1 minute or <7 at 5 minutes, neonatal intensive care unit admission, shoulder dystocia, and perinatal mortality). Unbooked antenatal care was defined as the absence of antenatal visits in public hospitals before admission for delivery. Data on prepregnancy BMI, haemoglobin level at the first visit, antenatal anaemia, and gestational diabetes mellitus were unavailable for unbooked women. Antenatal anaemia was defined as a haemoglobin level <11 g/dL at the booking visit. Causes of anaemia were classified as haemoglobinopathy, iron deficiency, or unclassified. Alpha thalassaemia, beta thalassaemia, or haemoglobin E were diagnosed by haemoglobin pattern. Iron deficiency was evidenced by a low ferritin level; unclassified cases were defined by normal haemoglobin pattern and ferritin levels. Obstetric service provision was identical for Chinese and non-Chinese women. Information and counselling sheets were available in Chinese and English. For women unable to read either language, on-site or telephone interpretation services were provided.

Statistical analysis was performed using SPSS (Windows version 27.0; IBM Corp, Armonk [NY], United States). Comparisons between the two groups were made using the Chi-squared test or Fisher's exact test for categorical variables and Student's *t* test or Mann-Whitney *U* test for continuous variables. Multivariable regression analyses were performed to determine independent factors associated with adverse outcomes. All tests were two-sided, and p values <0.05 were considered statistically significant.

Results

In total, 218 ethnic minority women and 218 matched Chinese women were included. Non-Chinese women were more often unbooked (7.8% vs 0.5%, p<0.001), had higher BMI (24.8 vs 22.5 kg/m^2, p<0.001), had lower haemoglobin levels at booking visits (11.8 vs 12.1 g/dL, p=0.038), and were more likely to have chronic hypertension (1.8% vs 0%, p=0.018) and preeclampsia (7.8% vs 2.8%, p=0.018) [Table 1]. However, non-Chinese women had lower intrapartum blood loss (255.96 vs 299.31 mL, p=0.006) and a lower incidence of PPH (6.9% vs 14.2%, p=0.013) but higher rates of overall (39.9% vs 23.9%, p<0.001) and emergency (28.9% vs 12.4%, p<0.001) lower-segment Caesarean section (Table 1).

Among women who underwent Caesarean section, non-Chinese women were more likely to undergo the procedure due to cephalopelvic disproportion (CPD) or lack of progress (21.8% vs 5.7%, p<0.001), failed induction (20.7% vs 13.2%, p=0.023), and hypertensive disorders (8.0% vs 0%, p=0.015) [Table 2]. Regarding neonatal outcomes, a trend towards higher neonatal intensive care unit admission rates was observed among non-Chinese women (6.0% vs 2.3%, p=0.054, Table 3).

In logistic and linear regression models, non-Chinese women were more likely to have preeclampsia (adjusted odds ratio [aOR]=3.35, p=0.026) and lower-segment Caesarean section (aOR=2.36, p<0.001) but were less likely to have PPH (aOR=0.29, p=0.002) [Table 4].

Table 1. Maternal antepartum and intrapartum characteristics between non-Chinese and Chinese women.

Characteristic	Non-Chinese (n=218)	Chinese (n=218)	p Value
Age, y	31.3±5.6	32.0±4.7	0.142
Prepregnancy body mass index, kg/m^2	24.8±4.8	22.5±4.2	<0.001
Parity			1
Nulliparous	87 (39.9)	87 (39.9)	
Multiparous	131 (60.1)	131 (60.1)	
Previous Caesarean section	37 (17.0)	26 (11.9)	0.134
Ethnicity			
Chinese	-	218 (100)	
Indonesian	32 (14.7)	-	
Indian	19 (8.7)	-	
Pakistani	57 (26.1)	-	
Nepalese	48 (22.0)	-	
Vietnamese	28 (12.8)	-	
African	4 (1.8)	-	
Thai	8 (3.7)	-	
Filipino	20 (9.2)	-	
Yemeni	1 (0.5)	-	
Bangladeshi	1 (0.5)	-	
Unbooked antenatal care	17 (7.8)	1 (0.5)	<0.001
History of substance abuse	2 (0.9)	5 (2.3)	0.449
History of mental illness	7 (3.2)	4 (1.8)	0.36
Haemoglobin level at booking visit, g/dL	11.8±1.3	12.1±1.2	0.038
Antenatal anaemia (haemoglobin <11 g/dL)	40/201 (19.9)	39/217 (18.0)	0.615
Cause of antenatal anaemia			
Alpha trait	1 (2.5)	5 (12.8)	0.217
Beta trait	3 (7.5)	9 (23.1)	0.104
Haemoglobin E	0	1 (2.6)	1
Iron deficiency	35 (87.5)	24 (61.5)	0.062
Unclassified	1 (2.5)	0	0.481
Gestational diabetes mellitus	49/201 (24.4)	35/217 (16.1)	0.089
Chronic hypertension	4 (1.8)	0	0.018
Preeclampsia	17 (7.8)	6 (2.8)	0.018
Placenta previa	3 (1.4)	1 (0.5)	0.623
Antepartum haemorrhage	1 (0.5)	2 (0.9)	1
Maternal mortality	0	0	-
Gestation, wk	38.28±1.9	38.42±1.94	0.44
Preterm delivery			
<37 weeks	23 (10.6)	16 (7.3)	0.24
<34 weeks	3 (1.4)	4 (1.8)	1
Blood loss, mL	255.96±156.98	299.31±168.18	0.006
Postpartum haemorrhage ≥500 mL	15 (6.9)	31 (14.2)	0.013
Cause of postpartum haemorrhage			
Atony	6 (40.0)	10 (32.2)	0.308
Wound bleeding	7 (46.7)	14 (45.2)	0.117
Retained products of gestation	0	3 (9.7)	0.248
Coagulopathy	1 (6.7)	0	1
Atony and wound bleeding	1 (6.7)	4 (12.9)	0.372
Induction of labour	82 (37.6)	79 (36.2)	0.77
Mode of delivery			
Normal vaginal delivery	126 (57.8)	151 (69.3)	0.006
Lower-segment Caesarean section	87 (39.9)	52 (23.9)	<0.001
Emergency	63 (72.4)	27 (51.9)	<0.001
Elective	24 (27.6)	25 (48.1)	0.879
Classical Caesarean section	0	1 (0.5)	1
Instrumental delivery	5 (2.3)	13 (6.0)	0.054
Vacuum extraction	5 (100)	10 (76.9)	0.189
Forceps delivery	0	3 (23.1)	0.248
Assisted breech delivery	0	1 (0.5)	1
3rd or 4th degree perineal tear	0	2 (0.9)	0.499
Birth weight, g	3133.83±477.54	3126.15±488.62	0.868

* Data are presented as mean ± standard deviation or No. (%) of patients

Table 2. Indications for Caesarean section in non-Chinese and Chinese women.

Indication	Non-Chinese (n=87)*	Chinese (n=53)*	p Value
Cephalopelvic disproportion or lack of progress	19 (21.8)	3 (5.7)	<0.001
Failed induction	18 (20.7)	7 (13.2)	0.023
Placenta previa or accreta spectrum	1 (1.1)	2 (3.8)	1
Intrauterine growth restriction	1 (1.1)	1 (1.9)	1
Previous Caesarean section	32 (36.8)	23 (43.4)	0.194
Hypertensive disorder of pregnancy	7 (8.0)	0	0.015
Malpresentation	3 (3.4)	9 (17.0)	0.079
Non-reassuring fetal status or suboptimal cardiotocogram	5 (5.7)	7 (13.2)	0.558
Unfavourable cervix	1 (1.1)	1 (1.9)	1

* Data are presented as No. (%) of patients

Table 3. Neonatal outcomes in non-Chinese and Chinese women.

Neonatal outcome	Non-Chinese (n=218)*	Chinese (n=218)*	p Value
Baby born before arrival	2 (0.9)	0	0.499
Composite adverse perinatal outcome	27 (12.4)	22 (10.1)	0.484
Low birth weight (≤2400 g)	14 (6.4)	14 (6.4)	1
Low Apgar score			
<4 at 1 minute	0	2 (0.9)	0.499
<7 at 5 minutes	0	1 (0.5)	1
Shoulder dystocia	0	0	-
Neonatal intensive care unit admission	13 (6.0)	5 (2.3)	0.054
Neonatal mortality	0	0	-

* Data are presented as No. (%) of patients

Table 4. Adverse outcomes in non-Chinese women.

Adverse outcome	Adjusted odds ratio or β (95% confidence interval)	p Value
Postpartum haemorrhage ≥500 mL	0.29 (0.14-0.64)	0.002
Preeclampsia	3.35 (1.15-9.73)	0.026
Lower-segment Caesarean section	2.36 (1.42-3.94)	<0.001
Low birth weight	19.5 (-48.07 to 87.04)	0.571
Neonatal intensive care unit admission	2.68 (0.75-9.6)	0.130

Discussion

In England, South Asian women have higher risks of stillbirth, preterm birth, and fetal growth restriction, compared with White women[10]. However, differences in fetal and other antenatal complications have not been widely investigated. In a cohort of 13 165 singleton pregnancies in the United Kingdom, South Asian women had a twofold higher prevalence of placental dysfunction—including hypertensive disorders, preterm birth, small-for-gestational-age infants, and stillbirth—compared with White women[11]. Nevertheless, South Asian women constituted only 17% of the study population.

The present study demonstrated that maternal ethnicity had a significant effect on adverse obstetric outcomes, which may be related to cultural differences and language barriers[12]. Ethnic minority women were more likely to have irregular or absent antenatal visits. Nevertheless, the present study did not address potential bias regarding quality of care, discrimination against ethnic minority women, or accessibility to healthcare.

Preeclampsia affects 2% to 5% of pregnant women and is a leading cause of maternal and perinatal morbidity

and mortality[13]. The prevalence of preeclampsia is lower in Chinese women (1.4%-2.8%) than in Indian women (4.6%) or Filipino women (5.6%)[14-16]. This finding suggests a genetic susceptibility to preeclampsia among South Asians. Moreover, lifestyle and diet contribute to differences among ethnic groups[17]. Low-dose aspirin prophylaxis is widely used in early pregnancy, optimally initiated before 16 weeks of gestation, for prevention of preeclampsia[18]. However, given the higher proportion of unbooked antenatal cases among ethnic minority women, risk factors may not be addressed in a timely manner, and aspirin prophylaxis may not be prescribed for preeclampsia prevention. Differences in health-seeking behaviour may also lead to reduced awareness of warning symptoms of potential obstetric complications and less frequent blood pressure monitoring at home.

Non-Chinese women were more likely to deliver by Caesarean section secondary to CPD. There is a lack of universal diagnostic criteria for CPD in current guidelines; however, in our practice, CPD is commonly diagnosed when labour progress is slow or arrested despite adequate uterine contractions, in the presence of a contracted pelvis and substantial caput and moulding on pelvic examination. Pelvimetry studies have shown that many women in Thailand and the Philippines have rounder pelvic inlets and often oval-shaped, narrower pelvises, features compatible with the anthropoid pelvic type, which predisposes to obstructed labour[18]. Further studies are warranted to evaluate the association between pelvimetry findings among ethnic minority women and obstructed labour, given that a contracted pelvis remains a key cause of obstructed labour leading to Caesarean delivery.

Non-Chinese women were significantly less likely to experience PPH than Chinese women. PPH is a leading cause of maternal mortality and morbidity. The most common cause of PPH is uterine atony, followed by perineal wound bleeding, retained placenta, and coagulation abnormalities. There may be a genetic predisposition to PPH[19]. Differences in thrombogenicity and bleeding tendency exist among ethnic groups. East Asians have a higher risk of bleeding events than Western populations; genetic differences affecting platelet function and responsiveness have been suggested as possible explanations[20,21].

The main limitations of the present study were its retrospective design and the small sample size from a single obstetric centre in Hong Kong. The 1:1 matched case-control design restricted the sample size and may have reduced the power to detect rare outcomes. Further studies with larger sample sizes could allow subgroup analyses of different ethnicities. There may have been recall bias regarding prepregnancy BMI. Some women with antenatal anaemia may have had undiagnosed alpha thalassaemia traits, given that alpha genotyping was not performed for all participants; haemoglobin pattern analysis alone cannot detect concealed alpha thalassaemia.

Public hospitals in Hong Kong have implemented measures to facilitate access to healthcare for ethnic minorities, including interpretation services and patient information leaflets in multiple languages[22]. Nevertheless, further efforts should be made to raise health awareness among ethnic minority women, particularly regarding preeclampsia prevention through antenatal screening and aspirin prophylaxis. Regular antenatal care is crucial to ensure safe delivery. Equity in maternal healthcare will require targeted policy initiatives that foster healthier and more effective health-seeking behaviour.

Conclusion

Compared with Chinese women, non-Chinese women had higher rates of unbooked antenatal care, preeclampsia, and Caesarean section, as well as lower haemoglobin levels at booking visits, but lower rates of PPH. Early recognition and close monitoring of risk factors are particularly important for ethnic minority women.

Contributors

All authors designed the study, acquired the data, analysed the data, drafted the manuscript, and critically revised the manuscript for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

As an editor of the journal, WLL was not involved in the peer review process. Other authors have disclosed no conflicts of interest.

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Data availability

All data generated or analysed during the present

study are available from the corresponding author on reasonable request.

Ethics approval

This study was approved by the Central Institutional Review Board of Hospital Authority (reference: CIRB-2024-587-5). The patients were treated in accordance with the tenets of the Declaration of Helsinki. The requirement for patient consent was waived by the Board due to the retrospective nature of the research.

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