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Obstetrician gender and the likelihood of performing a maternal request for a cesarean delivery☆

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Abstract

Objective: To examine the relationship between obstetrician gender and the likelihood of maternal request for cesarean section (CS) within different healthcare institutions (medical centers, regional hospitals, district hospitals, and obstetric and gynecology clinics).
Study design: Five years of population-based data from Taiwan covering 857,920 singleton deliveries without a clinical indication for a CS were subjected to a multiple logistic regression to examine the association between obstetrician gender and the likelihood of maternal request for a CS.
Results: After adjusting for physician and institutional characteristics, it was found that male obstetricians were more likely to perform a requested CS than female obstetricians in district hospitals (OR = 1.53) and clinics (OR = 2.26), while obstetrician gender had no discernible associations with the likelihood of a CS upon maternal request in medical centers and regional hospitals.
Conclusions: While obstetrician gender had the greatest association with delivery mode decisions in the lowest obstetric care units, those associations were diluted in higher-level healthcare institutions.

Keywords: Maternal request; Cesarean section; Physician gender; Clinic; Obstetrician

1. Introduction

Whether from clinical, ethical, or legal perspectives, few areas of current obstetric practice are attracting as much attention as issues surrounding maternal choice for a cesarean section (CS) in the absence of obstetric indications, with the proponents of requesting CSs arguing that maternal choice should be the major deciding factor with regard to the mode of delivery [1]. However, as a result of methodological and conceptual problems inherent in many prior studies, the role played by obstetricians in CSs being performed upon maternal request is still unclear [2]. It may also be difficult to separate the actual decisions of choosing CSs made by patients from those made by their doctor, since the decision to undertake a CS is one which is necessarily reached between both a woman and her obstetrician. It is, therefore, inevitable that the preference expressed by an obstetrician with regard to the mode of delivery will ultimately likely shape the mother's choice.

Prior studies examining obstetrician gender and their preferences for elective CS upon maternal request have revealed somewhat inconsistent findings. The London study undertaken by Al-Mufti et al. found that in the absence of any clinical indications, significantly more requested CSs were carried out by female than male obstetricians [3].

☆ Sources of information for the study: Secondary data released from Taiwan's National Health Insurance Research Database which included no patient, institution, or physician identifiers.

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Conversely, studies by Cotzias et al. in England [4], Gurgan et al. in Ireland [5], Bergholt et al. in Denmark [6], and Gonen et al. in Israel [7] found no discernible or significant gender influences in physicians' responses to performing elective CSs upon maternal request. Thus, the relationship between obstetrician gender and the preference for a CS upon maternal request remains inconclusive. In addition, the majority of the above studies have reported on obstetricians' preferences rather than what they actually offer to the women in their care.

The use of national data in Taiwan, covering virtually all child deliveries in a single year, presents us with an opportunity to examine the relationship between obstetrician gender and the likelihood of a CS being performed upon maternal request in the absence of obstetric indications. This study used 5 years of population-based data to examine the association across different levels of healthcare institutions (medical centers, regional hospitals, district hospitals, and obstetric and gynecology (ob/gyn) clinics). This study appears to be the first one trying to explore what obstetricians do in practice.

In Taiwan, all healthcare institutions are supervised by the Department of Health (DOH), and all medical centers are public or not-for-profit (NFP), whereas all ob/gyn clinics are for-profit (FP). Accreditation guidelines provided by the DOH propose a 30% ceiling on CS rates for all hospitals; however, clinics, are not subject to DOH accreditation [8]. Nevertheless, despite the lack of strict enforcement of such guidelines, it is likely that most medical centers and regional hospitals have internal review procedures in place, since they would not wish to exceed the suggested norms to such a degree as to attract negative attention from the accrediting authorities. It is also the case that obstetricians within clinics have greater discretion with regard to choosing the mode of delivery. As a result of these differences, we anticipated that any gender-specific differences in the likelihood of a maternal request for a CS being undertaken would be more pronounced within clinics than in medical centers or regional hospitals.

2. Materials and methods

Taiwan initiated the National Health Insurance (NHI) program in March 1995. Taiwan's NHI program has a unique combination of characteristics: universal coverage, a single-payer payment system with the government as the sole insurer, comprehensive benefits, access to any medical institution of the patient's choice, and a wide variety of providers including medical centers, regional hospitals, district hospitals, and ob/gyn clinics, well distributed throughout the country. This study used the 1998–2002 *National Health Insurance Research Database* (NHIRD) published by the Taiwan National Health Research Institute. The database provides registries of medical facilities contracting with the Bureau of the National Health Insurance (BNHI) and board-certified physicians, as well as monthly claim summaries for all inpatient claims for a population in excess of 23 million people. One principal ICD-9-CM diagnosis, and up to four secondary diagnoses, are listed for each patient.

The in-patient claims of all patients admitted to hospitals or ob/gyn clinics for child delivery between 1 January 1998 and 31 December 2002 were screened for the NHI's diagnosis-related group (DRG) codes 0373B (CS based upon a maternal request in the absence of obstetric indications), and 0373A (vaginal delivery (VD)). In Taiwan, the NHI reimbursement rate for medically necessary CSs is twice that of a maternally requested CS. It is in the provider's interest to ensure documentation of any secondary diagnosis that clinically justifies a CS. Moreover, the BNHI imposes high fines and censures for erroneous coding by auditing a random sample of records from each medical institution. Therefore, we believe that all cases where parturients had any chance of being clinically ineligible for a VD were excluded from the study sample.

In addition, those parturients with multiple gestations (ICD-9-CM 651 and 6562) – which, with regard to the mode of delivery, may have had different obstetric considerations compared to those of parturients with singleton gestations – were also excluded from the sample. In Taiwan, obstetricians perform all deliveries. We were ultimately left with a study sample of 857,920 singleton deliveries, comprised of 26,064 requested CSs [the majority of parturients had a principal diagnosis of ICD-9-CM code 66971 (cesarean delivery, without mention of indication)] and 831,856 VDs.

The SAS statistical package (SAS System for Windows, Version 8) was used to perform descriptive, bivariate, and multivariate logistic regression analyses. Parturient was the unit of analysis. The bivariate analyses were used to crudely estimate the odds ratio of the likelihood of a CS being performed upon maternal request by male or female obstetricians in different levels of healthcare institutions. Separate multivariate logistic regression analyses were also performed in order to evaluate the association between obstetrician gender and the likelihood of a CS being performed upon maternal request at the different healthcare institution levels. The dependent variable was treated as a dichotomous category based upon whether or not a CS was performed at the request of the mother (CS by maternal request = 1, VD = 0). The independent variable of interest was obstetrician gender. This study also controlled for obstetrician age (as a surrogate for practice experience), maternal age, institutional ownership, location, and teaching status.

3. Results

The sociodemographic characteristics of all parturients, delivering obstetricians, and healthcare institutions are summarized in Table 1. Of the 857,920 subjects sampled, 26,064 deliveries were performed by CS at the request of the

Table 1
Sociodemographic characteristics of delivering obstetricians, mothers, and healthcare institution in Taiwan in 2002

Characteristics	Medical centers (n = 122,111), R-CS n (%)	VD n (%)	Regional hospitals (n = 194,746), R-CS n (%)	VD n (%)	District hospitals (n = 247,751), R-CS n (%)	VD n (%)	Ob/gyn clinics (n = 293,312), R-CS n (%)	VD n (%)
Obstetrician characteristics								
Gender								
(Male)	3433 (3.1)	106,964 (96.9)	3828 (2.2)	171,608 (97.8)	7783 (3.3)	224,910 (96.7)	9540 (3.4)	270,215 (96.6)
(Female)	362 (3.1)	11,352 (96.9)	492 (2.5)	18,818 (97.5)	387 (2.6)	14,671 (97.4)	239 (1.8)	13,318 (98.2)
Mean obstetrician age (years)	42.5	41.9	42.2	43.0	44.4	43.1	46.0	45.0
Maternal characteristics								
Age, years								
($\leq$24)	323 (2)	16,476 (98)	755 (1.7)	43,223 (98.3)	1642 (2.2)	72,545 (97.8)	2512 (2.6)	94,107 (97.4)
($25 \leq$ age ≤ 34)	2433 (2.7)	86,269 (97.3)	2797 (2.1)	130,474 (97.9)	5420 (3.4)	151,749 (96.6)	6234 (3.5)	172,323 (96.5)
(≥ 35)	1039 (6.3)	15,571 (93.7)	768 (4.4)	16,729 (95.6)	1108 (6.8)	15,287 (93.2)	1033 (5.7)	17,103 (94.3)
Mean maternal age (years)	31.5	29.4	29.5	28.1	30.6	29.3	28.0	26.8
Institutional characteristics								
Ownership								
(Public)	743 (2.6)	27,582 (97.4)	898 (2.5)	35,671 (97.5)	404 (1.5)	26,426 (98.5)	0	0
(NFP)	3052 (3.3)	90,734 (96.7)	2313 (1.9)	117,083 (98.1)	845 (2.2)	36,904 (97.8)	0	0
(FP)	0	0	1109(2.9)	37,672 (97.1)	6921 (3.8)	176,251 (96.2)	9779 (3.3)	283,533 (96.7)
Teaching								
(Yes)	3795 (3.1)	118,316 (96.9)	4320 (2.2)	190,426 (97.8)	2418 (2.7)	85,820 (97.3)	0	0
(No)	0	0	0	0	5752 (3.6)	153,761 (96.4)	9779 (3.3)	283,533 (96.7)
Location								
(North)	2724 (3.7)	71,064 (96.3)	2170 (2.0)	105,900 (98.0)	2897 (4.4)	62,679 (95.6)	7131 (5.4)	125,437 (94.6)
(Center)	573 (2.3)	23,887 (97.7)	1142 (3.3)	33,903 (96.7)	2725 (2.7)	98,658 (97.3)	1259 (1.7)	71,340 (98.3)
(South)	477 (2.1)	22,099 (97.9)	816 (1.9)	41,671 (98.1)	2502 (3.2)	74,963 (96.8)	1380 (1.7)	78,400 (98.3)
(East)	21 (1.6)	1266 (98.4)	192 (2.1)	8952 (97.9)	46 (1.4)	3281 (98.6)	9 (0.1)	8356 (99.9)

R-CS, requested cesarean section; VD, vaginal delivery; NFP, not-for-profit; FP, for-profit. Medical centers: with at least 500 beds; regional hospitals: with at least 250 beds; district hospitals: with at least 20 beds; clinics: fewer than 10 beds.

mother, while the remaining 831,856 were VDs. Not surprisingly, the overwhelming percentages of obstetricians were male, including 88.0, 87.9, 88.00, and 87.4% of obstetricians in medical centers, regional hospitals, district hospitals, and ob/gyn clinics, respectively. With the exception of regional hospitals, male obstetricians at institutions of all other levels had consistently higher rates of requested CSs than their female counterparts.

Table 2, which presents the crude odds ratios of the likelihood of a CS upon maternal request based upon obstetrician, parturient, and healthcare institution characteristics, suggests that the likelihood of a CS being performed upon maternal request in medical centers and regional hospitals was not influenced by obstetrician gender. Conversely, in district hospitals and ob/gyn clinics, this study did find a significant association between obstetrician gender and the likelihood of a CS being performed upon maternal request. As compared to female obstetricians, the odds of male obstetricians performing a requested CS were 1.31 times higher in district hospitals and 1.97 times higher in ob/gyn clinics.

Table 3 describes the adjusted relationships between obstetrician gender and the likelihood of a CS being performed upon maternal request at different healthcare institution levels. After adjusting for obstetrician age, parturient age, and institutional location and ownership, the multivariate logistic regression analyses also showed that male obstetricians were more likely to perform a CS upon maternal request than were female obstetricians in district hospitals (OR = 1.53; 95% CI = 1.38–1.71) and ob/gyn clinics (OR = 2.26; 95% CI = 1.99–2.58). In contrast to district hospitals and clinics, we found that obstetrician gender had no discernible effects on the odds of a CS being performed upon maternal request in either medical centers or regional hospitals.

The results also demonstrate that decisions to perform a CS upon maternal request were significantly influenced by maternal age, and healthcare institutional ownership, location, and teaching status. The adjusted odds of a maternal request for an elective CS significantly increased with increasing maternal age across all healthcare institutions. However, the age of the obstetrician was of little consequence to the likelihood of a CS being performed upon maternal request.

4. Discussion

This study used population-based data for 5 years to explore the association between obstetrician gender and the likelihood of a CS being performed upon maternal request in the absence of obstetric indications. After controlling for characteristics of the obstetrician, parturient, and healthcare institution, we found that male obstetricians in district hospitals and ob/gyn clinics were more likely to perform a CS upon maternal request than were their female counterparts. This finding should be viewed in light of previous

Table 2
Crude odds ratios for the outcomes of requested cesarean sections

Characteristics	Medical centers (n = 122,111), crude OR 95% CI		Regional hospitals (n = 190,42), crude OR 95% CI		District hospitals (n = 247,751), crude OR 95% CI		Ob/gyn clinics (n = 293,312), crude OR 95% CI	
Obstetrician characteristics								
Gender								
(Male)	1.01	0.90–1.12	0.85	0.70–1.02	1.31***	1.18–1.45	1.97***	1.73–2.24
(Female)	1.00		1.00		1.00		1.00	
Obstetrician age (years)	1.02***	1.02–1.03	0.99***	0.99–1.00	1.01***	1.01–1.00	1.04***	1.03–1.04
Maternal characteristics								
Age, years								
(≤24)	0.71***	0.61–0.83	0.82***	0.75–0.88	0.63***	0.60–0.67	0.74***	0.70–0.77
(25 ≤ age ≤ 34)	1.00		1.00		1.00		1.00	
(≥35)	2.37***	2.20–2.55	2.14***	1.97–2.32	2.03***	1.90–2.17	1.67***	1.56–1.79
Institutional characteristics								
Ownership								
(Public)	0.80***	0.74–0.87	1.27***	1.18–1.38	0.67***	0.59–0.75		
(NFP)	1.00		1.00		1.00			
(FP)			1.49***	1.39–1.60	1.72***	1.60–1.84		
Teaching								
(Yes)					0.75***	0.72–0.79		
(No)					1.00			
Location								
(North)	1.00		1.00		1.00		1.00	
(Center)	0.63***	0.57–0.69	1.61***	1.53–1.77	0.60***	0.57–0.63	0.31***	0.29–0.33
(South)	0.56***	0.51–0.62	0.96	0.88–1.04	0.72***	0.68–0.76	0.31***	0.29–0.33
(East)	0.43***	0.28–0.67	1.05	0.90–1.22	0.30***	0.23–0.41	0.02***	0.01–0.04

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; R-CS, requested cesarean section; VD, vaginal delivery; NFP, not-for-profit; FP, for-profit; OR, odds ratio; CI, confidence interval.

Table 3
Multivariate logistic regression for the outcomes of requested cesarean sections

Characteristics	Medical centers (n = 122,111), adjusted OR 95% CI		Regional hospitals (n = 190,42), crude OR 95% CI		District hospitals (n = 247,751), crude OR 95% CI		Ob/gyn clinics (n = 293,312), crude OR 95% CI	
Obstetrician characteristics								
Gender								
(Male)	0.98	0.88–1.10	0.80	0.73–1.12	1.53***	1.38–1.71	2.26***	1.99–2.58
(Female)	1.00		1.00		1.00		1.00	
Obstetrician age (years)	1.01***	1.01–1.02	1.00	0.99–1.00	1.00***	1.00–1.01	1.03***	1.03–1.04
Maternal characteristics								
Age, years								
($\leq$24)	0.72***	0.62–0.85	0.79***	0.73–0.85	0.66***	0.62–0.70	0.76***	0.71–0.80
(25 $\leq$ age $\leq$ 34)	1.00		1.00		1.00		1.00	
($\geq$35)	2.27***	2.10–2.45	2.20***	2.03–2.39***	2.01***	1.88–2.15	1.60***	1.49–1.71
Institutional characteristics								
Ownership								
(Public)	0.72***	0.66–0.78	1.25***	1.15–1.35	0.59***	0.53–0.67		
(NFP)	1.00		1.00		1.00			
(FP)			1.24***	1.14–1.35	1.68***	1.54–1.82		
Teaching								
(Yes)					0.86***	0.82–0.91		
(No)					1.00			
Location								
(North)	1.00		1.00		1.00		1.00	
(Center)	0.65***	0.59–0.71	1.60***	1.47–1.75	0.51***	0.48–0.54	0.32***	0.30–0.34
(South)	0.60***	0.54–0.66	1.02	0.94–1.11	0.66***	0.63–0.70	0.31***	0.29–0.33
(East)	0.45***	0.29–0.70	1.14	0.98–1.33	0.43***	0.32–0.59	0.02***	0.01–0.04

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; R-CS, requested cesarean section; VD, vaginal delivery; NFP, not-for-profit; FP, for-profit; OR, odds ratio; CI, confidence interval.

studies indicating that obstetrician gender is a possible source of variations in medical practice [9–11]. Nevertheless, we observed no similar association in either medical centers or regional hospitals, which suggests that while the influence of obstetrician gender on delivery mode decisions is most obvious in lower-level obstetric care units, it becomes diluted in higher-level healthcare institutions.

In the absence of maternal indications, earlier studies provided inconclusive findings of a preference for a CS upon maternal request by female obstetricians over male obstetricians, or an insignificant association between obstetrician gender and the probability of a CS being performed upon maternal request [3–7]. Such findings are at odds with the results of this study. One possible contributory factor to the inconsistent findings between this and earlier studies is the application of different research methodologies. As opposed to the analysis of administrative data (the methodology adopted in this study), all of the earlier studies used survey research to explore the association between obstetrician gender and the responses to maternal requests for CSs. Given the inherent potential for recall (selection) bias or unreliable responses, such methodology might not have adequately reflected the actual experiences of obstetricians, or their attitudes towards CSs upon maternal request. In addition, prior studies only focused on obstetrician preferences rather than what they actually offered to women in their care.

Furthermore, prior studies did not take into consideration the potentially confounding effects of healthcare institutional characteristics on the attitudes or behavior of obstetricians. However, one must keep in mind that the present sample was limited to parturients in Taiwan; thus there may be contextual, cultural, and/or environmental differences between this study sample and those of other countries or regions.

Although, as expected, this study did find a very significant gender effect in ob/gyn clinics, the precise reasons for such a significant difference remain unclear. One possible cause is the financial incentives created by providing more-profitable procedures to patients: although the NHI reimbursement rates for VD and CS upon maternal request are identical in Taiwan, providers are permitted to charge patients the cost difference between a CS and VD.

Some of the earlier studies also reported a much-stronger preference for female obstetricians among female patients in ob/gyn care, based largely upon gender-specific problems, as well as the embarrassment and discomfort associated with exposure to an obstetrician and the discussion of sensitive, gender-specific matters across gender lines [12–14]. The limited number of female physicians may also intensify their market advantages over male physicians [15]. Consequently, the increasing competitive pressures from female obstetricians may inevitably drive male obstetricians to provide more-highly profitable procedures, such as CSs, so as to maintain their competitiveness in healthcare markets.

Communication also stands out as a further possible explanation for gender differences in the probability of a CS being performed upon maternal request in ob/gyn clinics.

Prior studies consistently revealed noticeable differences in communication patterns between male and female physicians and their patients [12,16,17]. Female physicians are, for example, more likely to engage in partnership building and psychosocial exchanges during the visit, while also being less verbally dominant than their male counterparts. Female physicians will arguably also have a better innate understanding of the female body; thus they will be more effective than their male counterparts in educating their patients, both before and during labor [10,18].

This study found no significant relationship between obstetrician gender and the likelihood of a CS being performed upon maternal request in either medical centers or regional hospitals, both of which are accredited as teaching hospitals. CS deliveries accounted for 32.3% of all live births in Taiwan in 2001 [8], a rate which is more than double the acceptable limit of 15% recommended by the World Health Organization [19]. In order to control, or even lower, the CS rate, accreditation guidelines provided by the DOH suggest a 30% ceiling on CS rates for all hospitals, a directive which, regardless of their gender, leaves obstetricians in all of Taiwan's teaching hospitals with little discretion for performing a CS upon maternal request. It may also reflect potential influences on maternal decision-making by alternative medical professionals within Taiwan's teaching hospitals, such as clinical residents and senior nursing staff. In addition to the attending obstetrician, a patient is typically attended by such hospital residents, which clearly gives rise to informal counseling opportunities by senior nursing personnel at various levels within the various teaching hospitals.

We need to point out some of the limitations to this study. First of all, there is a lack of critical data on maternal socioeconomic characteristics, parity, and infant size within the NHIRD, as well as data on neonate birth weight, which as noted by many earlier studies, may well influence the choice of delivery mode [20]. Second, our study did not precisely determine the causal relationships between obstetrician gender and the likelihood of a CS being performed upon maternal request, although the 5 years of cross-sectional data do provide a detailed picture of this relationship. Third, a small clinic may have only male obstetricians and this could compromise the results. Finally, this study did not address the process by which obstetricians choose, or are chosen by, their patients. It is also possible that women wanting to have a vaginal delivery are more likely to choose a female obstetrician - rather than those wishing to have a CS choosing male obstetricians, or men being more likely than women to agree.

5. Conclusions

This study reveals important associations of obstetrician gender with maternally requested CS decisions in lower-level obstetric care units; an association which we found to be particularly significant in ob/gyn clinics. The reasons for the gender differences are, however, less clear. Since the process could be chosen by obstetricians or expectant mothers, both male obstetricians and their patients should be encouraged to communicate more thoroughly about the decision of the choice of delivery mode. Further investigation is clearly required if we are to determine the main contributory factors to the high likelihood of male obstetricians performing CSs upon maternal request in ob/gyn clinics. Well-designed questionnaires and clinical surveys will be required, targeting both pregnant women and clinic obstetricians, before the government can confidently adopt any principled policy stand on requested CSs.

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