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ORIGINAL ARTICLE

Risk Factors for Major Pregnancy Complications in Female Cardiothoracic Surgeons

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ABSTRACT

Objective: The purpose of this study is to evaluate the prevalence and risk factors of pregnancy problems among female cardiothoracic surgeons to those of women from similar socioeconomic backgrounds.

Methods: Total 278 surgeons were presented in this study. Major antenatal pregnancy complications and the number of hours a mother worked while pregnancy were questions asked of surgeons who had delivered at least one live baby. SPSS 22.0 was used to analyze all data.

Results: The patients mean age was 33.19±7.29 years and had mean BMI 26.18±10.27 kg/m^2. During third trimester majority of the surgeons performed shift >6 overnight calls/mo and 215 (77.3%) cases had >12 h/wk operated hours. Frequency of major antenatal complication was found in 175 (62.9%) cases. Age >35 years (OR: 3.14, 95% CI: 1.18-7.27) and working more than 12 hours per week during the third trimester (OR: 3.47) were both associated with an increased risk of complications during pregnancy.

Conclusion: Female cardiothoracic surgeons suffer major complications during pregnancy. Age and working hours during pregnancy raise the risk of complications. Policies that support mother-fetal health and make childbirth simpler are needed to achieve gender equity in the workplace, training, and early careers.

Keywords: Complications, Pregnancy, Cardiothoracic Surgeons, Risk Factors

INTRODUCTION

Workplace exposure to certain risk factors can interfere with pregnancy. Chemical contaminants, such as organic solvents, can have a detrimental effect on pregnancy outcomes[1]. Biological agents that affect pregnancy are also well understood in the scientific literature[2]. While toxoplasmosis has an immediate effect on the developing embryo, influenza produces hyperthermia, which has a knock-on effect. There is evidence that biomechanical and organizational constraints, in addition to ionizing radiation, might hinder pregnancy[3,4]. Women working in healthcare may face such challenges. The potential for contamination or direct interaction with antineoplastic chemicals is a major worry for many health professionals, including doctors. Chemotherapy raises the risk of spontaneous abortion, according to a 2005 meta-analysis of 14 studies[5], although no studies have focused specifically on doctors. A prospective cohort study conducted in the United States found that nurses who had been exposed to antineoplastic medicines had a spontaneous abortion rate that was twice as high[6]. The nurses were exposed to varying degrees in the trial. Studying how anesthetic gases affect medical professionals is lacking. Research conducted after the turn of the millennium has shown an increased risk of various birth defects, but data on the dangers of fetal mortality is lacking (Warembourg et al., 2017[7]. Pregnancy problems, such as early labor and delivery and spontaneous abortions, are more common among night shift workers[8,9]. Also, even though there are more women than men working in healthcare, pregnant women are nevertheless subject to discrimination, particularly when it comes to the additional workload that their coworkers must endure [10]. Some women may delay becoming pregnant or choose to work later in the pregnancy due to the stigmatization they face. Cardiothoracic surgery will experience the greatest scarcity of any medical specialty by 2035, and this deficit will worsen over the next several decades[11] In order to address the anticipated shortfall, it is essential to study the factors that influence the career decisions of women in cardiothoracic surgery, as this surgical specialty is underrepresented in comparison to other competitive ones. Since women already constitute around half of the prospective candidates for medical school and general surgery residency programs, targeted initiatives to increase their interest in the specialty may lead to a more diverse and larger pool of applicants. Men and women alike cite issues with work-life balance and unhealthy lifestyles as reasons not to undergo cardiothoracic surgery. However, given the duration of the training, which happens to coincide with the optimal time to have a family, it is important to study the unique difficulties women face during pregnancy.

Policies and programs in more gender-balanced fields, such as general surgery, have been developed to preserve maternal health and improve workplace culture surrounding delivery based on data on pregnancy-related difficulties. However, there is a lack of information about the childbearing experience in cardiothoracic surgery, which is mainly a male-dominated surgical specialty.[12] There are a lot of obstacles that women applying to cardiothoracic surgery may encounter, such as a lack of positive role models who manage to have a family, work, and a profession, and a widespread belief that having children is a bad thing. Cardiothoracic surgeons' experiences with establishing a family may help other male-dominated surgical specialties make the move to parenthood more smoothly, especially as the value of a diverse workforce is increasingly acknowledged[11,12] The main goals of this study, which included female cardiothoracic surgeons, were to identify modifiable occupational risk variables associated with pregnancy complications and to quantify that risk.

MATERIALS AND METHODS

The study was conducted in Al-Aleem Medical College, Lahore during March 2022 to March 2023. A previously created questionnaire on pregnancy outcomes among general surgeons was utilized in this study. Surgeons and trainees from three different institutions worked together in focus groups using a Delphi technique to modify the questions so that they were more relevant to cardiothoracic surgery. The questions were revised several times.

We included male and female cardiothoracic surgery trainees and those who have given birth at least once in their lives. Exclusion criteria included not being parents and having a male surgeon partner. For their female non-surgeon partners, male cardiothoracic surgeons fielded questions about pregnancy. Due to

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the fact that factors other than socioeconomic status influence family planning among couples with at least one surgeon, these women were selected as a comparable sociodemographic control group. The availability of assisted reproductive technology (ART), level of health literacy, amount of time and money available for training, and the prevalence of a work-first mentality in the workplace are all factors that could affect the optimal time to start a family. Nobody was paid for their anonymous, volunteer contributions.

Ň2 analyses were used for categorical variables and t tests for continuous variables after the normal distribution was checked. Using multivariate logistic regression, factors having a P-value of less than or equal to 0.2 in the univariate analysis were found to be associated with serious pregnancy complications. A subgroup analysis was conducted on female cardiothoracic surgeons to determine surgical-specific risk variables for major pregnancy complications. The purpose of the analysis was to assess their call schedule and operating hours. Checking for multicollinearity was done using the variance inflation factor. P≤0.05 was set as the significance level. Statistics were conducted using Stata 24.0, developed by StataCorp.

RESULTS

The patients mean age was 33.19±7.29 years and had mean BMI 26.18±10.27 kg/m^2. 160 (57.6%) cases were from adult cardiac surgery, 80 (28.8%) were from thoracic surgery and 38 (13.7%) were from congenital cardiac surgery. 120 (43.2%) were professors, 90 (32.4%) were associate professors and 68 (24.5%) were assistant professors. (table 1)

Table-1: Details of the presented surgeons

Variables	Frequency	Percentage
Mean age (years)	33.19±7.29	
Mean BMI (kg/m^2)	26.18±10.27	
Specialty of surgeons		
Adult cardiac surgery	160	57.6
Thoracic surgery	80	28.8
Congenital cardiac surgery	38	13.7
Designation of surgeons		
Professors	120	43.2
Associate professors	90	32.4
Assistant professors	68	24.5

Table-2: Frequency of complications among all cases

Variables	Frequency (278)	Percentage
Major antenatal complications		
Yes	175	62.9
No	103	37.1
Preeclampsia		
Yes	35	12.6
No	243	87.4
Placental abruption		
Yes	17	6.1
No	261	93.9
Intrauterine growth restriction		
Yes	15	5.4
No	263	94.6
Minor complications		
Hyperemesis	8	2.9
Low back pain	4	1.4
Carpal tunnel syndrome	3	1.1
Mode of delivery		
C-section	162	58.3
Normal	116	41.7
PPH		
Yes	13	4.7
No	265	95.3

Frequency of major antenatal complication was found in 175 (62.9%) cases. Frequency of preeclampsia was found in 35 (12.6%) cases, placental abruption in 17 (6.1%) cases and intrauterine growth restriction in 15 (5.4%) cases. Hyperemesis, low back pain and carpal tunnel syndrome had less frequency. Majority of the cases were underwent for c-section and PPH was found in 13 (4.7%) cases.(table 2)

Age >35 years (OR: 3.14, 95% CI: 1.18-7.27) and working more than 12 hours per week during the third trimester (OR: 3.47) were both associated with an increased risk of complications during pregnancy. (table 3)

Table 3: Factors associated with an increased risk of complications

Variables	Complications	95% CI	P value
Age > 35 years	Pre-eclampsia	1.18-7.27	<0.003
Working hours 12h/week	Major antenatal	1.268-657	0.004

DISCUSSION

Despite the long-established male dominance, a growing number of women are opting to pursue careers in surgery[13] However, there are still fields that do not adequately represent both sexes; for example, cardiothoracic surgery, which has a persistent stigma and a dearth of female leaders[14] It is crucial to examine and maybe intervene in the pregnancy and parenthood workplace landscape since research in several areas of surgery has revealed that there are changing barriers that may negatively impact recruitment and retention[15] Female cardiothoracic surgeons had a higher rate of infertility and severe pregnancy complications than women with similar sociodemographic characteristics, according to the present study. Longer operating hours and older mothers are also associated with worse obstetric outcomes. With this information, policymakers may better support pregnant cardiothoracic surgeons and the surgical field at large. Gender diversity issues in other surgical specialties can be effectively addressed through these approaches, which may encourage female general surgery trainees during fellowship training to seek out careers with lower female representation.

Women make up less than 8% of practicing cardiothoracic surgeons, even though they have made up more than 50% of medical school matriculants for the past seven years.15,31%, or slightly less than 25%, of residents in elective cardiothoracic surgery[16] Gender disparities in the field will be even more critical in the following decade, when the demand for cardiothoracic surgeons will outstrip supply by 31%.[17] There has been a generational shift in which applicants of both sexes value work-family balance, but women may still be discouraged from pursuing cardiothoracic surgery careers owing to stereotypes that the field is incompatible with having children and the unique physical demands of pregnancy[18] Concerns about gender inequalities in parenthood are supported by the fact that female cardiothoracic surgeons were more likely to experience major pregnancy complications than their male colleagues' partners.

Unfortunately, this study confirms previous findings that link long business hours to unsavory pregnancy outcomes. Despite being typically aware of the hazards to their unborn children, a large percentage of the female surgeons in this study continued taking overnight calls and working long hours in the operating room well into their third trimester. Their timetables were altered for a small percentage of them. The motivation behind these acts came from a combination of modifiable cultural and structural components in the workplace, such as fear of stigma, guilt about adding extra work to coworkers' plates, and the need to make up for missed calls. This second issue puts pregnant surgeons in a difficult position; they must prioritize their health before and after giving birth, and they must also decide how much effort to put in. They find themselves in this jam when they are already struggling to balance their ambitions for professional growth with their growing list of household responsibilities. Similarly,[19] percent of female surgeons said they couldn't breastfeed because of various working issues, like not having enough room or time to express milk. Surgeons may experience more burnout due to work-home conflicts caused by the high rates of breastfeeding initiation found in this and other studies. It is more challenging for pregnant women to take the required steps to preserve the health of

themselves and their unborn child when they have an unhealthy obsession with work productivity at the cost of personal well-being[20].

The vast majority of female cardiothoracic surgeons choose to delay having children until later in life. This is due to concerns about social pressure and the negative effect of having a family on professional success. The risks of infertility and complications during pregnancy are well-documented after the age of euros, this study demonstrates that these delays could lead to significant consequences. Assisted reproductive technology (ART) was required to create a family by nearly a third of female cardiothoracic surgeons, compared to just 15% of male surgeons and 13% of the general population[21] The spouses of female cardiothoracic surgeons were more likely to utilize reproductive services, and their mothers were older than those of their male colleagues. This older maternal age was related with a higher risk of serious complications during pregnancy. This data explains why fewer women than men have children after becoming mothers; in fact, just 56% of women who say they want to start a family actually do so[19] Since many training programs do not end until around age 35, it may be beneficial to urge and facilitate pregnancy throughout training to reduce the chance of difficult pregnancies or involuntary childlessness.

Building a culture that emphasizes the ability to manage work and family duties requires a complete plan that includes policy reforms, leadership support, and advocacy. Within a traditionally hierarchical institution, trainees and junior academics are more likely to be in their reproductive years, have poor social capital, and not advocate for themselves. Policies that suitably reward covering colleagues while limiting clinical responsibilities during pregnancy are a win-win situation because they encourage young surgeons to start a family on their own pace and reduce the negative judgment and guilt associated with increasing their peers' burden. Reducing clinical responsibilities during pregnancy does not decrease the number of cases or academic output, according to cardiothoracic training programs that have implemented such regulations. Rather, it promotes an environment where trainees are encouraged to take care of themselves, regardless of their parental status[21]

CONCLUSION

Female cardiothoracic surgeons suffer major complications during pregnancy. Age and working hours during pregnancy raise the risk of complications. Policies that support mother-fetal health and make childbirth simpler are needed to achieve gender equity in the workplace, training, and early careers.

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