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ORIGINAL RESEARCH

# The Association Between Coffee and Tea Consumption During Pregnancy and Preterm Delivery: Case–Control Study

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**Objective:** To assess a possible association between coffee and tea consumption and preterm delivery.

**Methods:** A case–control design was implemented on a sample of women who were admitted for delivery to a tertiary hospital in the north of Jordan. Three hundred and fourteen cases and 796 controls were evaluated. The study was conducted while women were in the hospital for delivery. They were questioned about coffee and tea consumption and relevant confounding factors. Women were asked to state the average number of coffee and tea cups they drank per day.

**Results:** The mean coffee consumption among women with preterm delivery was 0.75 cups/ day  $\pm 1.23$  and the mean tea consumption was 1.47 cups/day $\pm 1.76$ . Multivariable logistic analysis revealed that increased age (OR=1.05; CI=1.02–1.08), parity (OR=3.82, CI=2.58–5.64), history of abortions (OR=1.69; CI=1.21–2.35), family history of preterm deliveries (OR=2.45, CI=1.33–4.52), having treatment for subfertility (OR=12.14, CI=2.39–61.62), diabetes mellitus (OR=2.22, CI=1.06–4.66), worsened emotional status during pregnancy (OR=2.35, CI=1.49–3.72), short inter-pregnancy interval (OR=1.72, CI=1.10–2.72), no iron consumption (OR=1.46, CI=1.06–2.03), using folic acid (OR=2.45, CI=1.33–4.52), and black colour women (OR=2.87, CI=1.35–6.10) were predictive for preterm delivery. After controlling for all significant predictors, coffee and tea consumption during pregnancy was not significantly associated with increased odds of preterm delivery. **Conclusion:** These results do not support an association between coffee and tea consumption and preterm delivery.

Keywords: coffee, pregnancy, preterm delivery, tea

### Introduction

About 75% of women consume coffee and tea during pregnancy which is probably the most frequently ingested pharmacologically active substance in the world.<sup>1</sup> Because of its wide consumption, the scientific community has expressed interest in the potential for coffee and tea to produce adverse effects on the developing fetus due to a possible increase in catecholamine concentrations that may interfere with placental blood flow. In addition to a delayed excretion of their metabolites due to fetal liver immaturity.<sup>1</sup> However, the safety of its consumption during pregnancy is still unresolved.<sup>2</sup> Areas of concern include possible association between coffee and tea consumption and preterm delivery, perinatal mortality and infant morbidity.<sup>3,4</sup>

Preterm delivery is the leading cause of perinatal morbidity and mortality. Whether coffee and tea intake during pregnancy is related to preterm delivery

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Studies on preterm delivery and its related factors among Middle Eastern women are sparse. Therefore, this case–control study was conducted to assess the association between coffee and tea consumption and preterm delivery among women in the north of Jordan.

# **Materials and Methods**

### Design

Un-matched case–control design was used in this study to assess the possible association between coffee and tea consumption and preterm delivery.

### Sample and Sampling Technique

The study population consisted of women who gave birth at a tertiary hospital in the north of Jordan. All women meeting the inclusion criteria were identified through examination of admission lists. Eligibility excluded those women with anemia, preeclampsia, multiple gestation, intra-uterine death, uterine anomalies and those with cervical deficiency requiring cervical cerclage. A total of 314 women who had given birth to a preterm baby (<37 completed weeks gestation, calculated from the 1st day of their last menstrual cycle, or as confirmed by first trimester ultrasound scan) were included. For controls, a total of 796 women were randomly selected using random number tables, from a pool of women who had given delivery to a full term baby (≥37 completed weeks gestation, calculated from the 1st day of their last menstrual cycle, or as confirmed by first trimester ultrasound scan) at the same time as the cases of the same period. Study subjects were enrolled in the study within 24 hours of delivery.

### Site and Setting of the Study

This study was conducted at a university-affiliated hospital in the north of Jordan. This is a community-based tertiary referral center with a patient population cared for by public-sector specialist staff physicians, obstetrics and gynecology residents, and perinatologists.

# Data Collection

A single staff nurse interviewer administered structured questionnaires to obtain information that covered the demographic characteristics, medical and reproductive history, drug use and habits such as smoking, coffee and tea consumption. The questionnaire asked for information about age, education level, occupation, total family income, pre-pregnancy weight, weight at delivery (kg), height (cm), blood group, and active or passive smoking status (the inhalation of smoke, called second-hand smoke, by persons other than the active smoker).

In order to standardize information regarding their coffee and tea consumption, all participants were shown a coffee cup of 75 mL and a tea cup of 150 mL. They were asked to state the average number of coffee and tea cups they drank per day and were categorized as: no consumption, one cup, two cups, and three or more cups per day.

Information was obtained regarding the number of previous live deliveries, abortions and still births, history of preterm or low birth weight deliveries, previous caesarian section and inter-pregnancy interval. Further information covered number of ante-natal visits, history of subfertility treatments, diabetes mellitus, hypertension, ante-partum hemorrhage, urinary tract infections, candidiasis and the general emotional status during pregnancy were collected. Emotional status was assessed by asking the participants to evaluate their emotional state during pregnancy, with a choice of one of three options: happiest time of life, coded 3, happy with few problems, coded 2, and unhappy, coded 1). Enquiries were made about their consumption of analgesics, antibiotics, iron, calcium and aspirin during pregnancy.

### Ethical Consideration

This study was approved by the Institutional Review Board of Jordan University of Science and Technology (JUST). Written informed consent was obtained from all study participants. Patient data privacy and confidentiality are maintained as this study was conducted in compliance with the ethical standards per Helsinki declaration.

### Statistical Analysis

The Statistical Package for Social Sciences software (SPSS, version 23, Chicago. Inc) was used for data processing and data analysis. Characteristics of subjects' variables were described using frequency distribution for categorical variables and mean and standard deviation for

continuous variables. Chi-square test was used to assess the association between categorical independent variables and preterm delivery. Independent sample *t*-test was used to assess the association between continuous independent variables and preterm delivery. All variables that were significant in the bivariate analysis (p < 0.05) were included in the binary logistic regression analysis to reach the best model. Coffee and tea drinking were entered in the final model to study their effects on preterm delivery after adjusting for significant variables.

### Results

# Sample Characteristics and the Association Between Preterm Delivery and Selected Demographical and Medical Variables

Of the 1120 pregnant women eligible for the study, 1110 (99%) accepted the invitation to participate. The total response rate was 99.1% (99.2% for cases and 98.7% for controls). Three percent of the respondents were black. Only 58% of respondents had a high school or above degree. The majority of respondents (98%, n=1082) did not smoke, with about 45% of them being passive smokers. The inter-pregnancy interval between the last two deliveries had been less than two years among 11% of the whole sample (n=126). Psychological status results showed that 21% of women felt that being pregnant was their happiest time ever. The percentage of respondents who reported no coffee or tea consumption during pregnancy was 60.3% and 44.9%, respectively. Three or more cups of coffee or tea were consumed by 7.8% and 19.7%, respectively. Differences in categorical demographic characteristics between cases and controls are presented in Table 1.

Forty percent of the respondents had an O blood group. Regarding previous pregnancies, 27% were primigravidae. More than one quarter of the respondents experienced previous abortions. The majority did not have a personal or a family history of preterm delivery or low weight deliveries. Almost 23% had at least one previous caesarian section. Almost all respondents reported neither subfertility treatment nor ante-partum bleeding. Diabetes was reported by 3.6% of the sample (n=40), while hypertension was reported by 16.3% of the sample (n=180). Results indicated that 17.4% (n=192) had urinary tract infection. Differences in categorical medical variables between cases and controls are presented in Table 2. The majority of respondents had taken iron, but not calcium, folic acid or aspirin tablets. About 21% of respondents reported using analgesics or antibiotics during pregnancy. Differences in drugs used during pregnancy between cases and controls are presented in Table 3.

Based on Chi-square results and at  $p \le 0.05$  significance level, participants who delivered preterm infants were predominantly black, passive smokers, primigravidae, diabetic, hypertensives, in addition to those with a history of giving birth to low weight babies, emotional difficulties, abortions, subfertility, family history of preterm deliveries, and folic acid consumption during pregnancy. Furthermore, it was found that women with history of preterm delivery were more likely to have consumed more tea and less iron tablets than their controls, but these associations were not significant at the 0.05 level (*p* values were 0.058 and 0.059, respectively). Coffee consumption seemed to have no effect on the chance of giving a preterm delivery (*p* = 0.391, as presented in Table 1).

# Differences Between Cases and Controls Based on Selected Demographical Variables

The mean age of the participants was  $29.18 \pm 6.11$  years. The average monthly family income was 210.45±136.90 dinars. The average pre-pregnancy weight, weight at delivery and height were 63.32±11.83 kg, 74.87±11.90 kg, and 161.95  $\pm 4.10$  cm, respectively. The mean of antenatal visit was 8.33  $\pm$  2.62. The mean coffee consumption among women with preterm delivery was 0.75 cups/day  $\pm 1.23$  and the mean tea consumption was 1.47 cups/day $\pm$  1.76. Independent *t*-test indicated that participants who delivered preterm infants were significantly older (p = 0.003). However, no significant differences were found in family income, pre-pregnancy weight (kg), weight at delivery (kg), height (cm), total antenatal visits, coffee consumption (cup/day), tea consumption (cup/day) between women with preterm, as opposed to term delivery. The difference between cases and controls in relation to continuous variables is shown in Table 4.

### Logistic Regression to Assess the Significant Predictors of Preterm Delivery

Stepwise logistic regression revealed that age, ethnicity, parity, history of abortions, family history of preterm deliveries, treatment for sub-fertility, diabetes, emotional status, number of years between deliveries, and iron or folic acid consumption were predictive for preterm

#### Table I Differences in Categorical Demographic Characteristics Between Cases and Controls

Image: second	Total, n (Percent)		Preterm Delivery			
Ethnic group White Black         1066 (96.9) 34 (3.1)         296 (94.3) 18 (5.7)         770 (98.0) 16 (2.00)         0.01           Education level Less than high school Above high school         450 (40.7) 342 (30.9)         126 (40.1) 88 (28.0)         324 (40.9) 254 (32.1)         0.216           Occupation Housewife Worker         996 (90.1)         252 (89.8)         714 (90.2)         0.864           Smoking No         1082 (98.0)         308 (98.1)         774 (98.0)         1.000           Pass Worker         668 (55.0)         156 (49.7)         452 (57.1)         0.026           Pass Worker         668 (55.0)         156 (49.7)         452 (57.1)         0.026           Pass Worker         250 (22.6)         90 (28.7)         168 (21.3)         0.008           Emotional state during programs/ Happet with few problems         222 (20.1)         54 (17.2)         168 (21.3)         0.008           I cup         264 (20.3)         72 (22.9)         152 (19.2)         0.008           I cup         224 (20.3)         72 (22.9)         152 (19.2)         0.391           Emotional state during programs/ Unhappy         Emotional state during programs/ 250 (22.6)         Emotional state during programs/ 250 (22.6)         Emotional state during programs/ 250 (22.6)         Emotional state during programs/ 250 (22.7)         0.008 <th></th> <th></th> <th>Yes, n (%)</th> <th>Normal, n (%)</th> <th>P value</th>			Yes, n (%)	Normal, n (%)	P value	
White Black         1066 (96.9) 34 (3.1)         296 (94.3) 18 (5.7)         770 (98.0) 16 (2.00)         0.001           Education level Less than high school         450 (40.7) 342 (30.9)         126 (40.1) 88 (28.0)         224 (40.9) 254 (32.1)         0.216           Migh school         342 (30.9)         88 (28.0)         254 (32.1)         0.216           Occupation Housewife         96 (90.1)         282 (89.8)         714 (90.2)         0.864           Smoking Vorker         996 (90.1)         282 (89.8)         744 (90.2)         0.864           Smoking Yes         0.02 (98.0)         308 (98.1)         774 (98.0)         1.000           Yes         0.02 (98.0)         156 (49.7)         156 (49.7)         612 (3.3)         0.026           Passive smoking Yes         0.02 (20.1)         156 (49.7)         166 (2.13)         0.008           Pape with few problems Unhappy         222 (20.1)         54 (17.2)         166 (21.3)         0.008           Coffee consumption/day No intake         666 (60.3)         158 (57.3)         34 (46.9)         0.391           Coffee consumption/day No intake         224 (20.3)         72 (22.9)         152 (19.2)         0.391           Coffee consumption (cup/day) No intake         466 (41.9)         132 (42.0)         364 (46.1)	Ethnic group					
Back         34 (3.1)         18 (5.7)         16 (2.00)           Education level Less than high school         450 (40.7) 342 (30.9)         126 (40.1) 88 (28.0)         324 (40.9) 254 (32.1)         0.216           Above high school         314 (28.4)         100 (31.8)         214 (27.0)         0.216           Occupation Housewife Worker         96 (90.1)         322 (10.2)         78 (98.0)         254 (32.1)         0.864           Smoking No         1082 (98.0)         308 (98.1)         714 (90.2)         0.864           Passive smoking No         222 (20.0)         61 (9.9)         166 (2.0)         0.026           Passive smoking No         222 (20.1)         54 (17.2)         168 (21.3)         0.026           Passive smoking No         222 (20.1)         54 (17.2)         168 (21.3)         0.026           Passive smoking No         222 (20.1)         54 (17.2)         168 (21.3)         0.026           No         158 (50.3)         158 (50.3)         34 (46.1)         0.026           Passive smoking No incide         666 (60.3)         180 (57.3)         160 (20.3)         0.026           Passive smoking No incide         222 (20.1)         54 (17.2)         168 (21.3)         0.018           Passive smoking No incide         222 (20.1)	White	1066 (96.9)	296 (94.3)	770 (98.0)	0.001	
Education level         Home is school         450 (40.7)         126 (40.1)         324 (40.9)         254 (32.1)           High school         342 (30.9)         88 (28.0)         214 (27.0)         214 (27.0)         214 (27.0)           Occupation         996 (90.1)         32 (10.2)         714 (90.2)         0.864           Worker         110 (9.9)         32 (10.2)         78 (98.0)         1.000           Smoking         1082 (98.0)         308 (98.1)         774 (98.0)         1.000           Yes         1082 (98.0)         308 (98.1)         774 (98.0)         1.000           Yes         608 (55.0)         156 (49.7)         452 (57.1)         0.026           Yes         498 (45.0)         159 (50.3)         340 (42.9)         0.008           Happiest moe of life         222 (20.1)         54 (17.2)         166 (21.3)         0.008           Happiest moe of life         532 (57.2)         170 (54.1)         462 (58.5)         0.008           Unhappy         250 (22.6)         90 (28.7)         160 (20.3)         0.391           Loup         224 (20.3)         72 (22.9)         152 (17.2)         86 (1.1)         0.391           Loup         204 (18.5)         42 (13.4)         140 (17.7)	Black	34 (3.1)	18 (5.7)	16 (2.00)		
Less than high school         450 (407)         126 (40.1)         324 (40.9)         0.216           High school         342 (30.9)         88 (28.0)         254 (32.1)         1           Above high school         314 (28.4)         100 (31.8)         214 (27.0)         0.864           Occupation         996 (90.1)         282 (89.8)         714 (90.2)         0.864           Worker         110 (9.9)         32 (10.2)         78 (98.)         1.000           Smoking         1082 (98.0)         308 (98.1)         774 (98.0)         1.000           Yes         22 (2.0)         6 (1.9)         16 (2.0)         0.026           Passive smoking         0.02 (98.0)         156 (49.7)         452 (57.1)         0.026           No         498 (45.0)         156 (93.7)         452 (57.1)         0.026           Happiest time of life         222 (20.1)         54 (17.2)         168 (21.3)         0.008           Happiest time of life         222 (20.1)         54 (17.2)         168 (45.5)         0.391           Unhappy         230 (22.6)         100 (27.3)         486 (45.5)         0.391           Lupp         224 (20.3)         72 (22.9)         152 (19.2)         152 (19.2)           Jon intake	Education level					
High school         342 (30.9)         88 (28.0)         254 (32.1)           Above high school         314 (28.4)         100 (31.8)         214 (27.0)           Occupation         996 (90.1)         282 (89.8)         714 (90.2)         0.864           Worker         110 (9.9)         32 (10.2)         78 (9.8)         0.864           Smoking         1062 (98.0)         308 (98.1)         774 (98.0)         1.000           Yes         22 (2.0)         6 (1.9)         16 (2.0)         1.000           Pasive smoking         608 (55.0)         156 (49.7)         452 (57.1)         0.026           Yes         498 (45.0)         158 (50.3)         340 (42.9)         0.008           Happiest time of life         522 (22.6)         90 (28.7)         168 (21.3)         0.008           Unhappy         250 (22.6)         90 (28.7)         160 (20.3)         0.008           Coffee consumption/day         52 (47.2)         160 (20.3)         0.011         0.024           No intake         666 (60.3)         180 (57.3)         486 (61.5)         0.391           1 cup         224 (20.3)         72 (22.9)         152 (19.2)         0.391           2 cups         128 (11.6)         40 (12.7)         88	Less than high school	450 (40.7)	126 (40.1)	324 (40.9)	0.216	
Above high school         314 (28.4)         100 (31.8)         214 (27.0)           Occupation Housewife Worker         996 (90.1)         222 (89.8)         714 (90.2)         0.864           Smoking No         110 (9.9)         22 (10.2)         78 (9.8)         1.000           Yes         1062 (98.0)         306 (98.1)         774 (98.0)         1.000           Pasive smoking No         608 (55.0)         156 (49.7)         452 (57.1)         0.026           Yes         498 (45.0)         158 (50.3)         340 (42.9)         0.008           Emotional state during pregnancy Happeix time of life         222 (20.1)         54 (17.2)         168 (21.3)         0.008           I cop 2 cups         250 (22.6)         90 (28.7)         160 (20.3)         0.008           Coffee consumption/day No intake         666 (60.3)         180 (57.3)         486 (61.5)         0.391           2 cups         128 (11.6)         40 (12.7)         88 (11.1)         23 (22.9)         152 (15.2)         216 (2.3)           2 cups         128 (16.5)         123 (42.0)         364 (46.1)         0.058           1 cup         208 (18.8)         68 (21.7)         140 (17.7)         20.05           2 cups         128 (16.5)         123 (42.0)	High school	342 (30.9)	88 (28.0)	254 (32.1)		
Occupation Housewife Worker         P96 (90.1) 32 (10.2)         282 (89.8) 714 (90.2) 78 (9.8)         714 (90.2) 78 (9.8)         0.864           Smoking No Yes         1082 (98.0) 22 (2.0)         308 (98.1) 6 (1.9)         774 (98.0) 16 (2.0)         1.000           Passive smoking No Yes         082 (98.0) 22 (2.0)         308 (98.1) 6 (1.9)         774 (98.0) 16 (2.0)         1.000           Passive smoking No Yes         089 (45.0)         156 (49.7) 158 (50.3)         452 (57.1) 450 (42.9)         0.26           Happiest time of life Happy with few problems Unhappy         222 (20.1) 53 (27.2)         54 (17.2) 170 (54.1)         168 (21.3) 460 (20.3)         0.008           Coffee consumption/day No intake         666 (60.3) 180 (57.3)         180 (57.3) 486 (61.5)         0.391           I cup 2 cups         128 (11.6) 224 (20.3)         128 (17.7) 40 (17.7)         88 (11.1) 23 (ups - 166 (7.8)         0.391           Tea consumption (cup/day) No intake         496 (44.9) 128 (16.5)         132 (42.0) 42 (13.4)         364 (46.1) 40 (17.7) 2 (2.9)         0.364           No intake No Yes         908 (18.8) 68 (78.4)         52 (80.1) 61 (67.78)         61 (61.5) 77 (22.2)         0.364           No intake No Yes         208 (18.8) 42 (13.4)         140 (17.7) 168 (15.5)         0.366           Parity No Yes         23 (2	Above high school	314 (28.4)	100 (31.8)	214 (27.0)		
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No Yes1082 (98.0)308 (98.1)774 (98.0)1.000Pasive smoking No22 (2.0)6 (1.9)16 (2.0)1Pasive smoking No498 (45.0)156 (49.7)452 (57.1)0.026Pres498 (45.0)158 (50.3)340 (42.9)0.026Emotional state during pregnancy Happiest time of life Happy with few problems222 (20.1)54 (17.2)168 (21.3)0.008Mappy250 (22.6)90 (28.7)160 (20.3)0.008Coffee consumption/day No intake666 (60.3)180 (57.3)486 (61.5)0.391I cup ≥ 1 cup ≥ 1 28 (11.6)128 (15.7)466 (61.5)0.3912 cups128 (11.6)40 (12.7)88 (11.1)364 (46.1)≥ 1 cup ≥ 3 cups208 (18.8)66 (21.7)140 (17.7)≥ 1 cup ≥ 1 cup208 (18.8)66 (21.7)140 (17.7)2 cups ≥ 1 cup218 (19.7)72 (22.9)156 (18.5)No intake 1 cup 2 cups218 (19.7)72 (22.9)146 (18.5)Analgesics intake No Yes238 (21.5)62 (19.9)176 (22.2)Parity No Yes294 (26.9)110 (35.0)184 (23.2) 608 (76.8)0.056Inter-pregnancy interval 294 (26.9)110 (35.0)184 (23.2) 608 (76.8)0.056Inter-pregnancy interval 294 (26.9)110 (35.0)184 (23.2) 608 (76.8)0.056	Smoking					
Yes22 (2.0) $6 (1.9)$ $16 (2.0)$ Passive smoking No Yes $608 (55.0)$ $498 (45.0)$ $156 (49.7)$ $158 (50.3)$ $452 (57.1)$ $340 (42.9)$ $0.026$ Emotional state during pregnancy Happiest time of life Happy $222 (20.1)$ $54 (17.2)$ $54 (17.2)$ $168 (21.3)$ $160 (20.3)$ $0.008$ Coffee consumption/day No intake $666 (60.3)$ $128 (11.6)$ $180 (57.3)$ $22 (7.0)$ $486 (61.5)$ $152 (19.2)$ $88 (11.1)$ $88 (11.1)$ $23 cups$ $0.391$ Tea consumption (cup/day) $1 cup2 cups2 cupsM9 (44.9)132 (42.0)132 (42.0)364 (46.1)0.058No intake1 cup2 cups2 cups496 (44.9)128 (11.6)132 (42.0)40 (12.7)88 (11.1)3 cups0.0058Tea consumption (cup/day)1 cup2 cups2 lis (19.7)132 (42.0)128 (14.4)364 (46.1)140 (17.7)2 cups2 cups2 lis (19.7)0.058Analgesics intakeNoYes866 (78.4)2 28 (21.5)252 (80.1)616 (77.8)176 (22.2)0.056ParityNoYes294 (26.9)812 (73.1)110 (35.0)204 (65.0)184 (23.2)608 (76.8)0.064Inter-pregnancy interval< 2 wars290 (98.6)270 (96.0)100 (98.6)0.070$	No	1082 (98.0)	308 (98.1)	774 (98.0)	1.000	
Passive smoking No         608 (55.0) 498 (45.0)         156 (49.7) 158 (50.3)         452 (57.1) 340 (42.9)         0.026           Emotional state during pregnancy Happiest time of life         222 (20.1)         54 (17.2)         168 (21.3)         0.008           Happy with few problems         222 (20.1)         54 (17.2)         169 (20.3)         0.008           Coffee consumption/day No intake         666 (60.3)         180 (57.3)         486 (61.5)         0.391           1 cup 2 cups         224 (20.3)         72 (22.9)         152 (19.2)         0.391           2 cups         128 (11.6)         40 (12.7)         88 (11.1)         88 (11.1)           23 cups         208 (18.8)         68 (21.7)         140 (17.7)         9.052           1 cup 2 cups         218 (19.7)         72 (22.9)         146 (18.5)         0.058           1 cup 2 cups         208 (18.8)         68 (21.7)         140 (17.7)         9.052           2 cups         218 (19.7)         72 (22.9)         164 (8.1)         0.058           1 cup 2 cups         218 (19.7)         140 (17.7)         9.056         0.366           No intake         686 (78.4)         252 (80.1)         616 (77.8)         0.366           No         238 (21.5)         62 (19.9)	Yes	22 (2.0)	6 (1.9)	16 (2.0)		
No Yes608 (55.0)156 (49.7)452 (57.1)0.026Yes498 (45.0)158 (50.3)340 (42.9)0Emotional state during pregnancy Happiest time of life222 (20.1)54 (17.2)168 (21.3)0.008Happy with few problems Unhappy632 (57.2)170 (54.1)462 (58.5)0.008Coffee consumption/day No intake666 (60.3)180 (57.3)466 (61.5)0.391No intake666 (60.3)128 (11.6)40 (12.7)88 (11.1)≥3 cups86 (7.8)22 (7.0)64 (8.1)0.058Tea consumption (cup/day) No intake496 (44.9)132 (42.0)364 (46.1)0.058No intake 1 cup208 (18.8)68 (21.7)140 (17.7)0.058Z cups 2 cups218 (19.7)72 (22.9)146 (18.5)0.391No intake 1 cup218 (19.7)72 (22.9)146 (18.5)0.058No intake 1 cup218 (19.7)72 (22.9)146 (17.7)0.058Analgesics intake No Yes238 (21.5)62 (19.9)176 (22.2)0.005Parity No Yes294 (26.9)110 (35.0)184 (23.2) 608 (76.8)0.005Inter-pregnancy interval <22 wars	Passive smoking					
Yes498 (45.0)158 (50.3)340 (42.9)Emotional state during pregnancy Happiest time of life222 (20.1)54 (17.2)168 (21.3)0.008Happy with few problems632 (57.2)170 (54.1)462 (58.5)0.008Unhappy250 (22.6)90 (28.7)160 (20.3)0.008Coffee consumption/day No intake666 (60.3)180 (57.3)486 (61.5)0.3911 cup224 (20.3)72 (2.9)152 (19.2)0.3912 cups128 (11.6)40 (12.7)88 (11.1)0.582 cups86 (78.9)22 (42.0)364 (46.1)0.0581 cup208 (18.8)68 (21.7)140 (17.7)0.581 cup208 (18.8)68 (21.7)140 (17.7)0.582 cups218 (19.7)72 (2.9)146 (18.5)0.366Analgesics intake Yes238 (21.5)62 (19.9)176 (22.2)0.364No Yes238 (21.5)224 (20.3)110 (35.0)184 (23.2)0.005Parity No Yes294 (26.9)110 (35.0)184 (23.2)0.005No Yes294 (26.9)110 (35.0)184 (23.2)0.005Inter-pregnancy interval <22 years	No	608 (55.0)	156 (49.7)	452 (57.1)	0.026	
Ernotional state during pregnancy Happiest time of life Happy with few problems Unhappy222 (20.1) $632 (57.2)$ $250 (22.6)$ 54 (17.2) $170 (54.1)$ $90 (28.7)$ 168 (21.3) $462 (58.5)$ $160 (20.3)$ 0.008Coffee consumption/day No intake666 (60.3) $224 (20.3)$ 180 (57.3) $72 (22.9)$ 486 (61.5) $152 (19.2)$ 0.391Coffee consumption/day No intake128 (11.6) $40 (12.7)$ 486 (61.5) $88 (11.1)$ 0.391Tea consumption (cup/day) No intake96 (7.8) $208 (18.8)$ 22 (20.0) $40 (17.7)$ 64 (4.1) $140 (17.7)$ 0.058Analgesics intake No Yes868 (78.4) $238 (21.5)$ 252 (80.1) $214 (15.5)$ 616 (77.8) $125 (19.9)$ 0.366Parity No Yes294 (26.9) $812 (73.1)$ 110 (35.0) $204 (65.0)$ 184 (23.2) $608 (76.8)$ 0.0058Inter-pregnancy interval $<22 years$ 294 (26.1) $216 (11.4)$ 202 (10.4) $370 (96.0)$ 0.008 (21.0) $710 (98.6)$ 0.008	Yes	498 (45.0)	158 (50.3)	340 (42.9)		
Happiest time of life Happy with few problems Unhappy222 (20.1) 632 (57.2)54 (17.2) 170 (54.1) 90 (28.7)168 (21.3) 462 (58.5) 160 (20.3)0.008Coffee consumption/day No intake $250 (22.6)$ 90 (28.7)160 (20.3)0.391Coffee consumption/day 1 cup 2 cups $224 (20.3)$ 128 (11.6)180 (57.3) 40 (12.7)486 (61.5) 88 (11.1) 88 (11.1)0.391Tea consumption (cup/day) No intake $496 (44.9)$ 208 (18.8)132 (42.0) 68 (21.7)364 (46.1) 140 (17.7)0.058Tea consumption (cup/day) No intake $496 (44.9)$ 208 (18.8)132 (42.0) 68 (21.7)364 (46.1) 140 (17.7)0.058Analgesics intake No Yes $868 (78.4)$ 238 (21.5) $252 (80.1)$ 210 (18.6) $616 (77.8)$ 616 (77.8)0.366Parity No Yes $294 (26.9)$ 812 (73.1) $110 (35.0)$ 204 (65.0) $184 (23.2)$ 608 (76.8)0.005Interpregnancy interval $< 22 years$ $294 (26.9)$ 812 (73.1) $204 (65.0)$ $82 (10.4)$ 82 (10.4)0.068	Emotional state during pregnancy					
Happy with few problems         632 (57.2)         170 (54.1)         462 (58.5)           Unhappy         250 (22.6)         90 (28.7)         160 (20.3)           Coffee consumption/day         I         I         I         I         I         I           No intake         666 (60.3)         180 (57.3)         486 (61.5)         0.391         0.391           I cup         224 (20.3)         72 (22.9)         152 (19.2)         88 (11.1)         38 (11.1)           ≥3 cups         128 (11.6)         40 (12.7)         88 (11.1)         364 (46.1)         0.058           Tea consumption (cup/day)         No         132 (42.0)         364 (46.1)         0.058           1 cup         208 (18.8)         68 (21.7)         140 (17.7)         364 (46.1)         0.058           1 cup         208 (18.8)         68 (21.7)         140 (17.7)         2 (13.4)         140 (17.7)         2 (2.9)         146 (18.5)         20 (19.9)         176 (22.2)         165           Analgesics intake         No         368 (78.4)         252 (80.1)         616 (77.8)         0.366           Yes         238 (21.5)         62 (19.9)         176 (22.2)         0.005         169           Yes         381 (73.1)         204 (	Happiest time of life	222 (20.1)	54 (17.2)	168 (21.3)	0.008	
Unhappy250 (22.6)90 (28.7)160 (20.3)Coffee consumption/day $Kar (66.6)$ $Kar ($	Happy with few problems	632 (57.2)	170 (54.1)	462 (58.5)		
Coffee consumption/dayImage: Second sec	Unhappy	250 (22.6)	90 (28.7)	160 (20.3)		
No intake666 (60.3)180 (57.3)486 (61.5)0.3911 cup224 (20.3)72 (22.9)152 (19.2)152 (19.2)2 cups128 (11.6)40 (12.7)88 (11.1)152 (19.2)≥3 cups86 (7.8)22 (7.0)64 (8.1)164 (8.1)Tea consumption (cup/day)No intake496 (44.9)132 (42.0)364 (46.1)1 cup208 (18.8)68 (21.7)140 (17.7)0.0582 cups182 (16.5)42 (13.4)140 (17.7)140 (17.7)≥3 cups218 (19.7)72 (22.9)146 (18.5)0.366Analgesics intake868 (78.4)252 (80.1)616 (77.8)0.366Yes238 (21.5)62 (19.9)176 (22.2)0.005ParityNo294 (26.9)110 (35.0)184 (23.2)0.005Yes812 (73.1)204 (65.0)608 (76.8)0.005Inter-pregnancy interval126 (11.4)44 (14.0)82 (10.4)0.084<2 years	Coffee consumption/day					
I cup224 (20.3)72 (22.9)152 (19.2)2 cups128 (11.6)40 (12.7)88 (11.1)≥3 cups86 (7.8)22 (7.0)64 (8.1)Tea consumption (cup/day)No intake496 (44.9)132 (42.0)364 (46.1)1 cup208 (18.8)68 (21.7)140 (17.7)2 cups182 (16.5)42 (13.4)140 (17.7)≥3 cups218 (19.7)72 (22.9)146 (18.5)Analgesics intake868 (78.4)252 (80.1)616 (77.8)No868 (78.4)252 (80.1)616 (77.8)0.366Yes238 (21.5)62 (19.9)176 (22.2)Parity294 (26.9)110 (35.0)184 (23.2)0.005No294 (26.9)110 (35.0)184 (23.2)0.005Yes812 (73.1)204 (65.0)608 (76.8)0.08429 years126 (11.4)44 (14.0)82 (10.4)0.084	No intake	666 (60.3)	180 (57.3)	486 (61.5)	0.391	
2 cups128 (11.6) 86 (7.8)40 (12.7) 22 (7.0)88 (11.1) 64 (8.1)Tea consumption (cup/day) No intake96 (44.9) 496 (44.9)132 (42.0) 132 (42.0)364 (46.1) 140 (17.7)0.058I cup 2 cups208 (18.8) 182 (16.5)68 (21.7) 42 (13.4)140 (17.7) 140 (17.7)0.058Analgesics intake No Yes868 (78.4) 238 (21.5)252 (80.1) 62 (19.9)616 (77.8) 176 (22.2)0.366Parity No Yes294 (26.9) 812 (73.1)110 (35.0) 204 (65.0)184 (23.2) 608 (76.8)0.0055Inter-pregnancy interval <2 years126 (11.4) 990 (88.6)44 (14.0) 270 (96.0)82 (10.4) 710 (99.6)0.084	l cup	224 (20.3)	72 (22.9)	152 (19.2)		
≥3 cups86 (7.8)22 (7.0)64 (8.1)Tea consumption (cup/day)496 (44.9)132 (42.0)364 (46.1)0.058No intake496 (44.9)132 (42.0)364 (46.1)0.0581 cup208 (18.8)68 (21.7)140 (17.7)140 (17.7)≥ 1 cups182 (16.5)42 (13.4)140 (17.7)146 (18.5)≥ 3 cups218 (19.7)72 (22.9)146 (18.5)0.366Analgesics intake868 (78.4)252 (80.1)616 (77.8)0.366No238 (21.5)62 (19.9)176 (22.2)0.005Parity294 (26.9)110 (35.0)184 (23.2)0.005No294 (26.9)110 (35.0)608 (76.8)0.005Inter-pregnancy interval126 (11.4)44 (14.0)82 (10.4)0.084	2 cups	128 (11.6)	40 (12.7)	88 (11.1)		
Tea consumption (cup/day)Image: No intake496 (44.9)132 (42.0)364 (46.1)0.058I cup208 (18.8)68 (21.7)140 (17.7)140 (17.7) $\geq$ cups182 (16.5)42 (13.4)140 (17.7) $\geq$ 3 cups218 (19.7)72 (22.9)146 (18.5)Analgesics intakeNoS68 (78.4)252 (80.1)616 (77.8)0.366Parity238 (21.5)238 (21.5)110 (35.0)184 (23.2)0.005No294 (26.9)110 (35.0)184 (23.2)0.005Inter-pregnancy intervalImage: Rest of the section	≥3 cups	86 (7.8)	22 (7.0)	64 (8.1)		
No intake496 (44.9)132 (42.0)364 (46.1)0.058I cup208 (18.8)68 (21.7)140 (17.7)140 (17.7)≥ cups182 (16.5)42 (13.4)140 (17.7)146 (18.5)≥3 cups218 (19.7)72 (22.9)146 (18.5)0.366Analgesics intake </td <td>Tea consumption (cup/day)</td> <td></td> <td></td> <td></td> <td></td>	Tea consumption (cup/day)					
I cup208 (18.8)68 (21.7)140 (17.7)2 cups182 (16.5)42 (13.4)140 (17.7)≥3 cups218 (19.7)72 (22.9)146 (18.5)Analgesics intakeNo868 (78.4)252 (80.1)616 (77.8)0.366Yes238 (21.5)62 (19.9)176 (22.2)0.366Parity294 (26.9)110 (35.0)184 (23.2)0.005Yes812 (73.1)204 (65.0)608 (76.8)0.005Inter-pregnancy interval126 (11.4)44 (14.0)82 (10.4)0.084	No intake	496 (44.9)	132 (42.0)	364 (46.1)	0.058	
2 cups182 (16.5)42 (13.4)140 (17.7)≥3 cups218 (19.7)72 (22.9)146 (18.5)Analgesics intake $rrrNo868 (78.4)252 (80.1)616 (77.8)0.366Yes238 (21.5)62 (19.9)176 (22.2)0.366Parityrrr<r<No294 (26.9)110 (35.0)184 (23.2)0.005Yes812 (73.1)204 (65.0)608 (76.8)0.005Inter-pregnancy intervalr<r<r<<2 years$	l cup	208 (18.8)	68 (21.7)	140 (17.7)		
≥3 cups218 (19.7)72 (22.9)146 (18.5)Analgesics intake No Yes868 (78.4) 238 (21.5)252 (80.1) 62 (19.9)616 (77.8) 176 (22.2)0.366Parity No Yes294 (26.9) 812 (73.1)110 (35.0) 204 (65.0)184 (23.2) 608 (76.8)0.005Inter-pregnancy interval < 2 years126 (11.4) 980 (88.6)44 (14.0) 270 (86.0)82 (10.4) 710 (99.6)0.084	2 cups	182 (16.5)	42 (13.4)	140 (17.7)		
Analgesics intake       868 (78.4)       252 (80.1)       616 (77.8)       0.366         Yes       238 (21.5)       62 (19.9)       176 (22.2)       0.366         Parity       294 (26.9)       110 (35.0)       184 (23.2)       0.005         Yes       812 (73.1)       204 (65.0)       608 (76.8)       0.005         Inter-pregnancy interval       126 (11.4)       44 (14.0)       82 (10.4)       0.084	≥3 cups	218 (19.7)	72 (22.9)	146 (18.5)		
No       868 (78.4)       252 (80.1)       616 (77.8)       0.366         Yes       238 (21.5)       62 (19.9)       176 (22.2)       0         Parity       294 (26.9)       110 (35.0)       184 (23.2)       0.005         Yes       812 (73.1)       204 (65.0)       608 (76.8)       0.005         Inter-pregnancy interval       2980 (88.6)       270 (86.0)       710 (89.6)       0.084	Analgesics intake					
Yes       238 (21.5)       62 (19.9)       176 (22.2)         Parity       Parity<	No	868 (78.4)	252 (80.1)	616 (77.8)	0.366	
Parity No Yes         294 (26.9)         110 (35.0)         184 (23.2)         0.005           Inter-pregnancy interval         204 (65.0)         608 (76.8)         0.005            126 (11.4)         44 (14.0)         82 (10.4)         0.084           >2 years         980 (88.6)         270 (96.0)         710 (99.6)         0.084	Yes	238 (21.5)	62 (19.9)	176 (22.2)		
No         294 (26.9)         110 (35.0)         184 (23.2)         0.005           Yes         812 (73.1)         204 (65.0)         608 (76.8)         0.005           Inter-pregnancy interval         2         2         2         2         2         2         10	Parity					
Yes         812 (73.1)         204 (65.0)         608 (76.8)           Inter-pregnancy interval         Image: Constraint of the state of the	No	294 (26.9)	110 (35.0)	184 (23.2)	0.005	
Inter-pregnancy interval         126 (11.4)         44 (14.0)         82 (10.4)         0.084           >2 years         980 (88.6)         270 (86.0)         710 (99.6)         0.084	Yes	812 (73.1)	204 (65.0)	608 (76.8)		
<2 years	Inter-pregnancy interval					
>2 years 980 (88.6) 270 (94.0) 710 (99.4)	<2 years	126 (11.4)	44 (14.0)	82 (10.4)	0.084	
-2 years 700 (00.0) 270 (00.0) 710 (07.0)	≥2 years	980 (88.6)	270 (86.0)	710 (89.6)		

delivery at the 0.05 significance level. Treatment for subfertility had the strongest association with preterm deliveries (adjusted OR = 12.14, 95% CI: 2.39-61.62), thus indicating that women with history of treatment for subfertility have a 12-fold increase in the likelihood of having a preterm delivery compared with their counterparts. Primiparity was second in its association with preterm delivery (adjusted OR = 3.82, 95% CI 2.58-5.64),

#### Table 2 Differences in Categorical Medical Variables Between Cases and Controls

Ves. n (%)Normal, n (%)P valueBlood group410 (27.7)104 (33.1)306 (38.7)0.322A154 (19.9)48 (15.3)106 (13.4)306 (38.7)0.322A78 (6.4)28 (8.7)50 (6.3)28 (6.5)28 (6.5)28 (6.5)O406 (40.4)118 (37.6)49 (51.1)40 (51.1)28 (7.7)28 (7.5)40 (51.1)DH1066 (96.4)22 (7.0)18 (2.3)0.00518 (2.3)0.005No22 (7.0)18 (2.3)20.00518 (2.3)0.005Hypertension22 (48.7)234 (74.5)690 (87.3)0.005No22 (7.0)18 (2.3)0.00522 (7.0)18 (2.3)History of preterm delivery1004 (92.8)256 (81.5)768 (97.2)0.005No1024 (92.8)256 (81.5)26 (81.5)22 (2.8)0.005History of low weight delivery1066 (91.1)262 (33.4)744 (94.2)0.005No98 (8.9)52 (16.6)46 (5.8)0.5180.518Yes1006 (91.1)262 (83.4)744 (94.2)0.518Vaginal bleeding during pregnancy1090 (98.7)308 (98.1)782 (99.0)0.229No1090 (98.7)308 (98.1)782 (99.0)0.005Yes1090 (98.7)308 (98.1)788 (97.7)0.005Yes1090 (98.7)308 (98.1)788 (97.7)0.005Yes1090 (98.7)308 (98.1)788 (97.7)0.005Yes1090 (98.7)308	Total, n (Percent)		Preterm Delive	Preterm Delivery		
Biood group         Io4 (3.1)         306 (38.7)         0.322           A         H         (19, 77)         104 (3.1)         306 (38.7)         0.322           AB         78 (6.4)         28 (8.7)         50 (6.3)         288 (35.5)         106 (13.4)           O         406 (40.4)         118 (37.6)         140 (5.1)         288 (35.5)         288 (35.5)         288 (35.5)           DM         1066 (96.4)         292 (73.0)         774 (97.7)         0.005         118 (2.3)         100 (12.7)         0.005           Yes         40 (3.5)         224 (83.7)         234 (74.5)         690 (67.3)         0.005           Yes         180 (16.3)         80 (25.5)         100 (12.7)         0.005         0.005           Yes         00 (7.2)         58 (18.5)         768 (97.2)         0.005         0.005           Yes         80 (7.2)         59 (18.5)         768 (97.2)         0.005         0.005           Yes         98 (8.9)         52 (16.4)         744 (94.2)         0.005         0.005           Yes         98 (8.9)         52 (16.4)         746 (58.9)         0.518         0.518           Yes         1006 (91.1)         260 (75.4)         768 (97.7)         200 (76.4)			Yes, n (%)	Normal, n (%)	P value	
A         410 (277)         104 (31)         306 (837)         0.322           B         154 (19.9)         48 (15.3)         106 (13.4)         154 (19.9)           AB         78 (64.0)         118 (37.6)         288 (65.)         106 (13.4)           O         466 (40.4)         118 (37.6)         288 (65.)         100           DM         1066 (96.4)         292 (93.0)         774 (97.7)         0.005           Yes         40 (3.5)         22 (7.0)         18 (2.3)         0.005           Hypertension         74         97.2         100 (12.7)         0.005           Yes         100 (16.3)         80 (25.5)         100 (12.7)         0.005           Yes         1004 (92.8)         256 (81.5)         768 (97.2)         0.005           Yes         80 (7.2)         58 (18.5)         728 (97.2)         0.005           Yes         98 (8.9)         52 (16.6)         46 (5.8)         0.005           No         252 (16.5)         748 (97.2)         0.005         0.005           Yes         98 (8.9)         52 (16.6)         108 (72.2)         0.005           Yes         1006 (91.1)         262 (83.4)         744 (94.2)         0.005 <td< td=""><td>Blood group</td><td></td><td></td><td></td><td></td></td<>	Blood group					
B         154 (19.9)         48 (15.3)         106 (13.4)           AB         78 (6.4)         28 (8.9)         50 (6.3)           O         28 (8.4)         288 (36.5)         118 (37.6)           Unknown         56 (5.7)         16 (5.1)         40 (5.1)         0.005           No         228 (36.5)         774 (97.7)         0.005           Yes         1066 (96.4)         22 (7.0)         714 (97.7)         0.005           Hypertension         22 (43.7)         234 (74.5)         690 (87.3)         0.005           No         924 (83.7)         234 (74.5)         690 (87.3)         0.005           Yes         180 (16.3)         80 (72.5)         100 (12.7)         0.005           History of preterm delivery         256 (81.5)         768 (97.2)         0.005           Yes         1004 (92.8)         256 (81.5)         768 (97.2)         0.005           Yes         200 (72.3)         80 (72.3)         80 (72.3)         80 (72.3)         80 (72.3)         90.005           Yes         246 (22.3)         74 (73.6)         172 (21.8)         0.005           Yes         246 (22.3)         74 (74.36)         172 (21.8)         0.005           Yes         109	A	410 (27.7)	104 (33.1)	306 (38.7)	0.322	
AB         78 (6.4)         28 (8.9)         50 (6.3)         288 (3.5)           O         406 (40.4)         118 (37.6)         288 (3.5)         40 (5.1)           DM         292 (93.0)         774 (97.7)         80 (3.5)           No         1066 (96.4)         292 (93.0)         774 (97.7)         0.005           Hypertension         22 (7.0)         18 (2.3)         0.005           No         924 (83.7)         234 (74.5)         690 (87.3)         0.005           Yes         180 (16.3)         80 (25.5)         100 (12.7)         0.005           History of preterm delivery         1024 (92.8)         256 (81.5)         766 (97.2)         0.005           No         1024 (92.8)         252 (16.6)         766 (97.2)         0.005           Yes         1006 (91.1)         262 (83.4)         744 (94.2)         0.005           Yes         98 (8.9)         52 (16.6)         46 (5.8)         0.518           History of caesarian delivery         1090 (98.7)         240 (76.4)         418 (78.2)         0.518           Yes         1090 (98.7)         308 (98.1)         782 (99.0)         0.229           Yes         1090 (98.7)         302 (96.2)         788 (99.7)         0.005	В	154 (19.9)	48 (15.3)	106 (13.4)		
O         406 (40.4)         118 (37.6)         288 (36.5)         200           DM         1066 (96.4)         292 (93.0)         774 (97.7)         0.005           Yes         40 (3.6)         22 (7.0)         18 (2.3)         0.005           Hypertension         24 (83.7)         234 (74.5)         690 (87.3)         0.005           Yes         180 (16.3)         234 (74.5)         690 (87.3)         0.005           History of preterm delivery         180 (16.3)         256 (81.5)         768 (97.2)         0.005           No         1024 (92.8)         256 (81.5)         768 (97.2)         0.005           Yes         80 (72.7)         58 (18.5)         768 (97.2)         0.005           History of low weight delivery         1006 (91.1)         262 (83.4)         744 (94.2)         0.005           Yes         240 (76.4)         618 (78.2)         172 (21.8)         0.518           History of casarian delivery         1090 (98.7)         308 (98.1)         722 (99.0)         0.229           No         1090 (98.7)         308 (98.1)         728 (99.7)         0.005           Yes         14 (1.3)         302 (96.2)         788 (99.7)         0.005           Yes         1090 (98.7)	AB	78 (6.4)	28 (8.9)	50 (6.3)		
Unknown         56 (S.7)         16 (S.1)         40 (S.1)           DM No         1066 (96.4)         292 (93.0)         774 (97.7)         0.005           Pyses         40 (3.6)         22 (7.0)         18 (2.3)         0.005           Hypertension No         924 (83.7)         234 (74.5)         690 (87.3)         0.005           No         180 (16.3)         80 (25.5)         100 (12.7)         0.005           Yes         1024 (92.8)         256 (81.5)         766 (97.2)         0.005           Yes         80 (7.2)         58 (18.5)         22 (2.8)         0.005           History of low weight delivery No         1056 (91.1)         252 (83.4)         744 (94.2)         0.005           Yes         98 (8.9)         25 (16.6)         768 (97.2)         0.005           History of caesarian delivery No         1090 (98.7)         240 (76.4)         618 (78.2)         172 (21.8)           Yes         1090 (98.7)         308 (98.1)         782 (99.0)         0.229         240.3           Yes         1090 (98.7)         302 (96.2)         788 (97.7)         2.03         0.005           Yes         1090 (98.7)         302 (96.2)         788 (97.7)         0.005         0.005 <t< td=""><td>0</td><td>406 (40.4)</td><td>118 (37.6)</td><td>288 (36.5)</td><td></td></t<>	0	406 (40.4)	118 (37.6)	288 (36.5)		
DM No         1066 (96.4) 40 (3.6)         292 (93.0) 22 (7.0)         774 (97.7) 18 (2.3)         0.005           Hypertension No Yes         224 (83.7) 180 (16.3)         234 (74.5) 80 (25.5)         690 (87.3) 100 (12.7)         0.005           History of preterm delivery No         1024 (92.8) 22 (28)         256 (81.5)         768 (97.2) 22 (28)         0.005           History of low weight delivery No Yes         1004 (92.8) 80 (7.2)         262 (81.4) 55 (18.5)         744 (94.2) 22 (2.8)         0.005           History of low weight delivery No Yes         1006 (91.1) 98 (8.9)         262 (83.4) 52 (16.6)         744 (94.2) 46 (5.8)         0.005           Vaginal bleeding during pregnancy No Yes         1006 (92.7) 246 (22.3)         308 (98.1) 6 (1.9)         782 (99.0) 8 (1.0)         0.229           Family history of preterm deliveries No Yes         1090 (98.7) 14 (1.3)         308 (98.1) 6 (1.9)         782 (99.0) 8 (1.0)         0.229           Family history of preterm deliveries No Yes         1090 (98.7) 10 (0.9)         302 (96.2) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Family history of preterm deliveries No Yes         1094 (99.1) 10 (0.9)         308 (98.1) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Family history of low weight deliveries No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         28 (97.7) 2 (0.3)         0.005 </td <td>Unknown</td> <td>56 (5.7)</td> <td>16 (5.1)</td> <td>40 (5.1)</td> <td></td>	Unknown	56 (5.7)	16 (5.1)	40 (5.1)		
No         1066 (96.4)         292 (93.0)         774 (97.7)         0.005           Hypertension         22 (7.0)         18 (2.3)         0.005           No         224 (83.7)         224 (74.5)         690 (87.3)         0.005           History of preterm delivery         1024 (92.8)         256 (81.5)         768 (97.2)         0.005           No         1024 (92.8)         256 (81.5)         768 (97.2)         0.005           Pieso         1024 (92.8)         256 (81.5)         768 (97.2)         0.005           Yes         1006 (91.1)         262 (83.4)         744 (94.2)         0.005           Yes         98 (8.9)         52 (16.6)         46 (5.8)         0.005           Yes         98 (8.9)         240 (76.4)         618 (78.2)         0.518           Vaginal bleeding during pregnancy         530 (77.7)         240 (76.4)         618 (78.2)         0.518           No         1090 (98.7)         308 (98.1)         782 (99.0)         0.229           Yes         1090 (98.7)         302 (96.2)         788 (99.7)         0.005           Yes         1090 (98.7)         302 (96.2)         788 (99.7)         0.005           Yes         1099 (98.7)         302 (96.2)         2 (0	DM					
Yes40 (3.6)22 (7.0)18 (2.3)Hypertension No Yes924 (83.7) 180 (16.3)234 (74.5) 80 (25.5)690 (87.3) 100 (12.7)0005History of preterm delivery No Yes1024 (92.8) 80 (7.2)256 (81.5) 58 (18.5)768 (97.2) 22 (2.8)0.005History of low weight delivery No Yes1006 (91.1) 98 (8.9)252 (16.6) 52 (16.6)744 (94.2) 46 (5.8)0.005History of casarian delivery No Yes1006 (91.1) 98 (8.9)262 (16.6) 52 (16.6)744 (94.2) 46 (5.8)0.005History of casarian delivery No Yes1090 (98.7) 14 (1.3)240 (76.4) 6 (1.9)618 (78.2) 8 (1.0)0.518Pregnancy following sub-fertility treatment No Yes1090 (98.7) 14 (1.3)302 (96.1) 302 (96.2)788 (97.7) 2 (0.3)0.005Family history of preterm deliveries No Yes1094 (99.1) 10 (0.9)306 (97.5) 8 (2.5)788 (99.7) 2 (0.3)0.005Family history of low weight deliveries No Yes1094 (99.3) 10 (0.9)308 (98.1) 8 (2.5)788 (99.7) 2 (0.3)0.003Family history of low weight deliveries No Yes1094 (99.3) 10 (0.9)308 (98.1) 8 (2.5)788 (99.7) 2 (0.3)0.003Family history of low weight deliveries No Yes1094 (99.3) 10 (0.9)308 (98.1) 8 (2.5)788 (99.7) 2 (0.3)0.003History of low weight deliveries No Yes1096 (99.3) 10 (0.9)308 (98.1) 8 (2.5)788 (97.7) 2 (0.3)0.003History of low weight del	No	1066 (96.4)	292 (93.0)	774 (97.7)	0.005	
Hypertension No Yes924 (83.7) 180 (16.3)234 (74.5) 80 (25.5)690 (87.3) 100 (12.7)0.005History of preterm delivery No Yes1024 (92.8) 80 (7.2)256 (81.5) 58 (18.5)768 (97.2) 22 (2.8)0.005History of low weight delivery Yes1024 (92.8) 80 (7.2)256 (81.5) 58 (18.5)764 (94.2) 46 (5.8)0.005History of low weight delivery Yes1006 (91.1) 98 (8.9)262 (83.4) 52 (16.6)744 (94.2) 46 (5.8)0.005History of caesarian delivery No Yes1006 (92.1) 98 (8.9)240 (76.4) 46 (5.8)618 (78.2) 172 (21.8)0.518Vaginal bleeding during pregnancy No Yes1090 (98.7) 14 (1.3)208 (98.1) 308 (98.1) 5 (1.9)752 (99.0) 8 (1.0)0.229Pregnancy following sub-fertility treatment No Yes1094 (99.1) 10 (0.9)302 (96.2) 308 (97.5)788 (99.7) 2 (0.3)0.005Family history of preterm deliveries No Yes1096 (99.3) 8 (0.7)308 (98.1) 5 (2.19)788 (99.7) 2 (0.3)0.005Family history of low weight deliveries No Yes1096 (99.3) 8 (0.7)308 (98.1) 5 (1.9)788 (99.7) 2 (0.3)0.005Iurinary tract infection No Yes192 (62.6) 192 (17.4)250 (79.6) 6 (1.9)622 (83.8) 128 (16.2)0.098Mo Yes192 (02.6) 192 (02.4)198 (63.1) 198 (63.1)588 (74.2) 104 (5.8)0.095	Yes	40 (3.6)	22 (7.0)	18 (2.3)		
No         924 (83.7)         234 (74.5)         690 (87.3)         0.005           Yes         180 (16.3)         80 (25.5)         100 (12.7)         0           History of preterm delivery         1024 (92.8)         256 (81.5)         768 (97.2)         0.005           Yes         80 (7.2)         58 (18.5)         22 (2.8)         0.005           History of low weight delivery         1006 (91.1)         262 (83.4)         744 (94.2)         0.005           Yes         98 (8.9)         52 (16.6)         46 (5.8)         0.005           History of caesarian delivery         858 (77.7)         240 (76.4)         618 (78.2)         0.518           Yes         1090 (98.7)         308 (98.1)         782 (99.0)         0.229           Yes         1090 (98.7)         302 (96.2)         788 (99.7)         0.005           Yes         1090 (98.7)         12 (3.8)         2 (0.3)         0.005           Family history of preterm deliveries         1094 (99.1)         306 (97.5)         788 (99.7)         0.005           No         1094 (99.1)         306 (97.5)         2 (0.3)         0.005           Yes         1094 (99.1)         306 (97.5)         2 (0.3)         0.005           Yes         1	Hypertension					
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	No	924 (83.7)	234 (74.5)	690 (87.3)	0.005	
History of preterm delivery No Yes1024 (92.8) 80 (72)256 (81.5) 58 (18.5)768 (97.2) 22 (2.8)0.005History of low weight delivery No Yes1006 (91.1) 98 (8.9)262 (83.4) 52 (16.6)744 (94.2) 46 (5.8)0.005History of caesarian delivery No Yes246 (22.3)744 (94.2) 52 (16.6)0.005History of caesarian delivery No Yes858 (77.7) 240 (76.4)240 (76.4) 618 (78.2) 172 (21.8)618 (78.2) 172 (21.8)0.518Vaginal bleeding during pregnancy No Yes1090 (98.7) 14 (1.3)308 (98.1) 6 (1.9)782 (99.0) 8 (1.0)0.229Pregnancy following sub-fertility treatment No Yes1090 (98.7) 14 (1.3)302 (96.2) 12 (3.8)788 (99.7) 2 (0.3)0.005Family history of preterm deliveries No Yes1094 (99.1) 10 (0.9)306 (97.5) 8 (2.5)788 (99.7) 2 (0.3)0.005Family history of low weight deliveries No Yes1094 (99.1) 8 (0.7)308 (98.1) 306 (97.5)788 (99.7) 2 (0.3)0.005Family history of low weight deliveries No Yes1094 (99.1) 8 (0.7)308 (98.1) 6 (1.9)788 (99.7) 2 (0.3)0.003Urinary tract infection No Yes1096 (97.3) 8 (0.7)308 (98.1) 6 (1.9)788 (97.7) 2 (0.3)0.003Urinary tract infection No Yes912 (82.6) 192 (17.4)250 (79.6) 6 (4 (20.4)662 (83.8) 128 (16.2)0.098No Yes320 (28.9)116 (36.9) 116 (36.9)204 (25.8)0.005	Yes	180 (16.3)	80 (25.5)	100 (12.7)		
No Yes1024 (92.8) 80 (7.2)256 (81.5) 58 (18.5)768 (97.2) 22 (2.8)0.005History of low weight delivery No Yes1006 (91.1) 98 (8.9)262 (83.4) 52 (16.6)744 (94.2) 46 (5.8)0.005History of caesarian delivery No Yes858 (77.7) 246 (22.3)240 (76.4) 74 (23.6)618 (78.2) 172 (21.8)0.518Vaginal bleeding during pregnancy No Yes1090 (98.7) 14 (1.3)308 (98.1) 6 (1.9)782 (99.0) 8 (1.0)0.229Pregnancy following sub-fertility treatment No Yes1090 (98.7) 14 (1.3)302 (96.2) 12 (3.8)788 (99.7) 2 (0.3)0.005Family history of preterm deliveries No Yes1094 (99.1) 10 (0.9)308 (98.1) 8 (2.5)788 (99.7) 2 (0.3)0.005Family history of low weight deliveries No Yes1094 (99.1) 8 (0.7)308 (98.1) 2 (0.3)788 (99.7) 2 (0.3)0.005Family history of low weight deliveries No Yes1096 (99.3) 8 (0.7)308 (98.1) 6 (1.9)788 (99.7) 2 (0.3)0.003Family history of low weight deliveries No Yes1096 (99.3) 10 (0.9)308 (98.1) 8 (2.5)788 (99.7) 2 (0.3)0.003Mo Yes1096 (99.3) 12 (82.6) 192 (17.4)308 (98.1) 6 (1.9)788 (99.7) 2 (0.3)0.003Mo Yes1096 (99.3) 12 (82.6) 192 (17.4)108 (63.1) 6 (1.9)288 (72.2) 2 (0.3)0.003Mo Yes1092 (28.9)116 (36.9) 116 (36.9)0.0050.005	History of preterm delivery					
Yes         80 (7.2)         58 (18.5)         22 (2.8)           History of low weight delivery No Yes         1006 (91.1)         262 (83.4)         744 (94.2)         0.005           History of caesarian delivery No Yes         98 (8.9)         52 (16.6)         46 (5.8)         0.005           History of caesarian delivery No Yes         858 (77.7)         240 (76.4)         618 (78.2)         0.518           Vaginal bleeding during pregnancy No         1090 (98.7)         308 (98.1)         782 (99.0)         0.229           Yes         1090 (98.7)         308 (98.1)         782 (99.0)         0.229           Yes         1090 (98.7)         302 (96.2)         788 (99.7)         0.005           Yes         1090 (98.7)         302 (96.2)         788 (99.7)         0.005           Yes         1090 (98.7)         306 (97.5)         788 (99.7)         0.005           Yes         1094 (99.1)         306 (97.5)         2 (0.3)         0.005           Family history of preterm deliveries No Yes         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           Viriary tract infection No Yes         1912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)	No	1024 (92.8)	256 (81.5)	768 (97.2)	0.005	
History of low weight delivery No Yes1006 (91.1) 98 (8.9)262 (83.4) 52 (16.6)744 (94.2) 46 (5.8)0.005History of caesarian delivery No Yes858 (77.7) 246 (22.3)240 (76.4) 74 (23.6)618 (78.2) 172 (21.8)0.518Vaginal bleeding during pregnancy No Yes1090 (98.7) 14 (1.3)308 (98.1) 6 (1.9)782 (99.0) 8 (1.0)0.229Pregnancy following sub-fertility treatment No Yes1090 (98.7) 14 (1.3)302 (96.2) 12 (3.8)788 (99.7) 2 (0.3)0.005Family history of preterm deliveries No Yes1094 (99.1) 10 (0.9)306 (97.5) 8 (2.5)788 (99.7) 2 (0.3)0.005Family history of low weight deliveries No Yes1096 (99.3) 8 (0.7)308 (98.1) 6 (1.9)788 (99.7) 2 (0.3)0.003Urinary tract infection No Yes912 (82.6) 192 (17.4)250 (79.6) 	Yes	80 (7.2)	58 (18.5)	22 (2.8)		
No Yes1006 (91.1) 98 (8.9)262 (83.4) 52 (16.6)744 (94.2) 46 (5.8)0.005History of caesarian delivery No Yes858 (77.7) 246 (22.3)240 (76.4) 74 (23.6)618 (78.2) 172 (21.8)0.518Vaginal bleeding during pregnancy No Yes1090 (98.7) 14 (1.3)308 (98.1) 6 (1.9)782 (99.0) 8 (1.0)0.229Pregnancy following sub-fertility treatment No Yes1090 (98.7) 14 (1.3)302 (96.2) 12 (3.8)788 (99.7) 2 (0.3)0.005Family history of preterm deliveries No Yes1094 (99.1) 10 (0.9)306 (97.5) 8 (2.5)788 (99.7) 2 (0.3)0.005Family history of low weight deliveries No Yes1096 (99.3) 8 (0.7)308 (98.1) 8 (2.5)788 (99.7) 2 (0.3)0.003Urinary tract infection No Yes912 (82.6) 192 (17.4)250 (79.6) 6 (4 (20.4)662 (83.8) 128 (16.2)0.098Abortion No Yes320 (28.9)116 (36.9) 116 (36.9)588 (74.2) 204 (25.8)0.005	History of low weight delivery					
Yes         98 (8.9)         52 (16.6)         46 (5.8)           History of caesarian delivery No Yes         858 (77.7) 246 (22.3)         240 (76.4) 74 (23.6)         618 (78.2) 172 (21.8)         0.518           Vaginal bleeding during pregnancy No Yes         1090 (98.7) 14 (1.3)         308 (98.1) 6 (1.9)         782 (99.0) 8 (1.0)         0.229           Pregnancy following sub-fertility treatment No Yes         1090 (98.7) 14 (1.3)         302 (96.2) 12 (3.8)         788 (99.7) 2 (0.3)         0.005           Family history of preterm deliveries No Yes         1094 (99.1) 10 (0.9)         306 (97.5) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Family history of low weight deliveries No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Urinary tract infection No Yes         1912 (82.6) 192 (17.4)         250 (79.6) 6 (4 (20.4)         662 (83.8) 128 (16.2)         0.098           Abortion No Yes         786 (71.1) 320 (28.9)         198 (63.1) 198 (63.1)         588 (74.2) 204 (25.8)         0.005	No	1006 (91.1)	262 (83.4)	744 (94.2)	0.005	
History of caesarian delivery No Yes         858 (77.7) 246 (22.3)         240 (76.4) 74 (23.6)         618 (78.2) 172 (21.8)         0.518           Vaginal bleeding during pregnancy No Yes         1090 (98.7) 14 (1.3)         308 (98.1) 6 (1.9)         782 (99.0) 8 (1.0)         0.229           Pregnancy following sub-fertility treatment No Yes         1090 (98.7) 14 (1.3)         302 (96.2) 12 (3.8)         788 (99.7) 2 (0.3)         0.005           Family history of preterm deliveries No Yes         1094 (99.1) 10 (0.9)         306 (97.5) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Family history of low weight deliveries No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Urinary tract infection No Yes         1096 (99.3) 8 (0.7)         250 (79.6) 6 (1.9)         662 (83.8) 128 (16.2)         0.098           Abortion No Yes         912 (82.6) 192 (17.4)         250 (79.6) 64 (20.4)         662 (83.8) 128 (16.2)         0.098	Yes	98 (8.9)	52 (16.6)	46 (5.8)		
No         858 (77.7)         240 (76.4)         618 (78.2)         0.518           Yes         246 (22.3)         74 (23.6)         172 (21.8)         0.518           Yaginal bleeding during pregnancy         1090 (98.7)         308 (98.1)         782 (99.0)         0.229           Yes         1090 (98.7)         308 (98.1)         782 (99.0)         0.229         0.229           Pregnancy following sub-fertility treatment <t< td=""><td>History of caesarian delivery</td><td></td><td></td><td></td><td></td></t<>	History of caesarian delivery					
Yes         246 (22.3)         74 (23.6)         172 (21.8)           Vaginal bleeding during pregnancy No Yes         1090 (98.7) 14 (1.3)         308 (98.1) 6 (1.9)         782 (99.0) 8 (1.0)         0.229           Pregnancy following sub-fertility treatment No Yes         1090 (98.7) 14 (1.3)         302 (96.2) 12 (3.8)         788 (99.7) 2 (0.3)         0.005           Family history of preterm deliveries No Yes         1094 (99.1) 10 (0.9)         306 (97.5) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Family history of low weight deliveries No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Urinary tract infection No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Urinary tract infection No Yes         912 (82.6) 192 (17.4)         250 (79.6) 642 (83.8) 128 (16.2)         662 (83.8) 128 (16.2)         0.098           Abortion No Yes         786 (71.1) 320 (28.9)         198 (63.1) 116 (36.9)         588 (74.2) 204 (25.8)         0.005	No	858 (77.7)	240 (76.4)	618 (78.2)	0.518	
Vaginal bleeding during pregnancy No Yes         1090 (98.7) 14 (1.3)         308 (98.1) 6 (1.9)         782 (99.0) 8 (1.0)         0.229           Pregnancy following sub-fertility treatment No Yes         1090 (98.7) 14 (1.3)         302 (96.2) 12 (3.8)         788 (99.7) 2 (0.3)         0.005           Family history of preterm deliveries No Yes         1094 (99.1) 10 (0.9)         306 (97.5) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Family history of low weight deliveries No Yes         1094 (99.1) 10 (0.9)         306 (97.5) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Urinary tract infection No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Urinary tract infection No Yes         1096 (97.5) 8 (0.7)         500 (79.6) 6 (4 (20.4)         642 (83.8) 128 (16.2)         0.098           Abortion No Yes         786 (71.1) 320 (28.9)         198 (63.1) 116 (36.9)         588 (74.2) 204 (25.8)         0.005	Yes	246 (22.3)	74 (23.6)	172 (21.8)		
No         1090 (98.7)         308 (98.1)         782 (99.0)         0.229           Yes         14 (1.3)         6 (1.9)         8 (1.0)         0.229           Pregnancy following sub-fertility treatment         1090 (98.7)         302 (96.2)         788 (99.7)         0.005           Yes         14 (1.3)         12 (3.8)         2 (0.3)         0.005         0.005           Family history of preterm deliveries         1094 (99.1)         306 (97.5)         788 (99.7)         0.005           Yes         10 0 (9.9)         8 (2.5)         2 (0.3)         0.005         0.005           Family history of low weight deliveries         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           No         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           Yes         8 (0.7)         6 (1.9)         2 (0.3)         0.003           Urinary tract infection         912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.005           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.	Vaginal bleeding during pregnancy					
Yes         14 (1.3)         6 (1.9)         8 (1.0)           Pregnancy following sub-fertility treatment No Yes         1090 (98.7)         302 (96.2)         788 (99.7)         0.005           Yes         14 (1.3)         12 (3.8)         2 (0.3)         0.005           Family history of preterm deliveries No Yes         1094 (99.1)         306 (97.5)         788 (99.7)         0.005           Family history of low weight deliveries No Yes         1094 (99.1)         306 (97.5)         788 (99.7)         0.005           Family history of low weight deliveries No Yes         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           Urinary tract infection No Yes         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           Vers         8 (0.7)         6 (1.9)         2 (0.3)         0.003           Urinary tract infection No Yes         912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.005           Abortion No Yes         786 (71.1)         198 (63.1)         588 (74.2)         0.005	No	1090 (98.7)	308 (98.1)	782 (99.0)	0.229	
Pregnancy following sub-fertility treatment No Yes         1090 (98.7) 14 (1.3)         302 (96.2) 12 (3.8)         788 (99.7) 2 (0.3)         0.005           Family history of preterm deliveries No Yes         1094 (99.1) 10 (0.9)         306 (97.5) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Family history of low weight deliveries No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Urinary tract infection No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Momentary tract infection No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Momentary tract infection No Yes         1096 (97.5) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Abortion No Yes         912 (82.6) 192 (17.4)         198 (63.1) 198 (63.1)         588 (74.2) 204 (25.8)         0.005	Yes	14 (1.3)	6 (1.9)	8 (1.0)		
No         1090 (98.7)         302 (96.2)         788 (99.7)         0.005           Yes         14 (1.3)         12 (3.8)         2 (0.3)         0.005           Family history of preterm deliveries         1094 (99.1)         306 (97.5)         788 (99.7)         0.005           Yes         10 (0.9)         8 (2.5)         2 (0.3)         0.005           Family history of low weight deliveries         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           Yes         1096 (99.3)         308 (98.1)         788 (99.7)         0.003         0.003           Urinary tract infection         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           No         12 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.005           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	Pregnancy following sub-fertility treatment					
Yes         14 (1.3)         12 (3.8)         2 (0.3)           Family history of preterm deliveries No Yes         1094 (99.1) 10 (0.9)         306 (97.5) 8 (2.5)         788 (99.7) 2 (0.3)         0.005           Family history of low weight deliveries No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Urinary tract infection No Yes         1096 (99.3) 8 (0.7)         250 (79.6) 64 (20.4)         662 (83.8) 128 (16.2)         0.098           Abortion No Yes         912 (82.6) 192 (17.4)         250 (79.6) 64 (20.4)         658 (74.2) 128 (16.2)         0.005	No	1090 (98.7)	302 (96.2)	788 (99.7)	0.005	
Family history of preterm deliveries         1094 (99.1)         306 (97.5)         788 (99.7)         0.005           Yes         10 (0.9)         8 (2.5)         2 (0.3)         0.005           Family history of low weight deliveries         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           Yes         8 (0.7)         6 (1.9)         2 (0.3)         0.003         0.003           Urinary tract infection         912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.005           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	Yes	14 (1.3)	12 (3.8)	2 (0.3)		
No       1094 (99.1)       306 (97.5)       788 (99.7)       0.005         Yes       10 (0.9)       8 (2.5)       2 (0.3)       0.005         Family history of low weight deliveries       1096 (99.3)       308 (98.1)       788 (99.7)       0.003         Yes       8 (0.7)       6 (1.9)       2 (0.3)       0.003         Urinary tract infection       912 (82.6)       250 (79.6)       662 (83.8)       0.098         Yes       192 (17.4)       64 (20.4)       128 (16.2)       0.005         Abortion       786 (71.1)       198 (63.1)       588 (74.2)       0.005         Yes       320 (28.9)       116 (36.9)       204 (25.8)       0.005	Family history of preterm deliveries					
Yes         10 (0.9)         8 (2.5)         2 (0.3)           Family history of low weight deliveries No Yes         1096 (99.3) 8 (0.7)         308 (98.1) 6 (1.9)         788 (99.7) 2 (0.3)         0.003           Urinary tract infection No Yes         912 (82.6) 192 (17.4)         250 (79.6) 64 (20.4)         662 (83.8) 128 (16.2)         0.098           Abortion No Yes         786 (71.1) 320 (28.9)         198 (63.1) 116 (36.9)         588 (74.2) 204 (25.8)         0.005	No	1094 (99.1)	306 (97.5)	788 (99.7)	0.005	
Family history of low weight deliveries         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           Yes         8 (0.7)         6 (1.9)         2 (0.3)         0.003           Urinary tract infection         912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.005           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	Yes	10 (0.9)	8 (2.5)	2 (0.3)		
No         1096 (99.3)         308 (98.1)         788 (99.7)         0.003           Yes         8 (0.7)         6 (1.9)         2 (0.3)         0.003           Urinary tract infection         912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.098           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	Family history of low weight deliveries					
Yes         8 (0.7)         6 (1.9)         2 (0.3)           Urinary tract infection         912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.098           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	No	1096 (99.3)	308 (98.1)	788 (99.7)	0.003	
Urinary tract infection         912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.098           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	Yes	8 (0.7)	6 (1.9)	2 (0.3)		
No         912 (82.6)         250 (79.6)         662 (83.8)         0.098           Yes         192 (17.4)         64 (20.4)         128 (16.2)         0.098           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	Urinary tract infection					
Yes         192 (17.4)         64 (20.4)         128 (16.2)           Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	No	912 (82.6)	250 (79.6)	662 (83.8)	0.098	
Abortion         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	Yes	192 (17.4)	64 (20.4)	128 (16.2)		
No         786 (71.1)         198 (63.1)         588 (74.2)         0.005           Yes         320 (28.9)         116 (36.9)         204 (25.8)         0.005	Abortion					
Yes 320 (28.9) 116 (36.9) 204 (25.8)	No	786 (71.1)	198 (63.1)	588 (74.2)	0.005	
	Yes	320 (28.9)	116 (36.9)	204 (25.8)		

thus indicating that primiparous women have a 4-fold increase in the likelihood of having a preterm delivery compared to multiparous. The black ethnic group had the third strongest association with preterm delivery (adjusted OR = 2.87, 95% CI: 1.35–6.10), thus indicating that black women have an almost 3-fold increase in the likelihood of having a preterm delivery compared to their white counterparts (Table 5).

#### Table 3 Differences in Drugs Used During Pregnancy Between Cases and Controls

Total, n (Percent)		Preterm Delivery			
		Yes, n (%)	Normal, n (%)	P value	
Iron intake					
No	294 (26.6)	96 (30.6)	198 (25.0)	0.059	
Yes	812 (73.4)	218 (69.4)	594 (75.0)		
Folic acid intake					
No	1048 (94.8)	288 (91.7)	760 (96.0)	0.004	
Yes	58 (5.2)	26 (8.3)	32 (4.0)		
Calcium intake					
No	1070 (96.7)	304 (96.8)	766 (96.7)	0.934	
Yes	36 (3.3)	10 (3.2)	26 (3.3)		
Analgesics intake					
No	868 (78.4)	252 (80.1)	616 (77.8)	0.366	
Yes	238 (21.5)	62 (19.9)	176 (22.2)		
Antibiotics intake					
No	874 (79.0)	244 (77.7)	630 (79.5)	0.498	
Yes	232 (21.0)	70 (22.3)	162 (20.5)		
Baby aspirin intake					
No	1042 (94.2)	292 (93.0)	750 (94.7)	0.274	
Yes	64 (5.8)	22 (7.0)	42 (5.3)		

Table 4 Differences in Continuous Demographic Characteristics Between Cases and Controls

Total Mean ± SD		Preterm Delivery			
		Yes Mean ± SD	No Mean ± SD	p value	
Age (years)	29.18 ± 6.11	29.61 ± 5.96	28.47 ± 5.48	0.003	
Total family income (JD/month)	210.45 ± 136.90	210.83 ± 133.95	210.80 ± 146.05	0.997	
Pre-pregnancy weight (kg)	63.32 ± 11.83	65.27 ± 12.50	64.05 ± 11.40	0.133	
Weight at delivery (kg)	74.87 ± 11.90	76.23 ± 12.70	74.98 ± 11.81	0.133	
Height (cm)	161.95 ± 4.10	161.88 ± 4.76	161.99 ± 4.54	0.733	
Total antenatal visits	8.33 ± 2.62	8.32 ± 2.93	8.34 ± 2.90	0.920	
Coffee consumption (cup/day)	0.74 ± 1.30	0.75 ± 1.23	0.73 ± 1.86	0.773	
Tea consumption (cup/day)	1.35 ± 174	1.47 ± 1.76	1.29 ± 1.61	0.115	

Regarding the emotional factor, there was a linear trend in the risk of preterm delivery as the emotional status worsened. Similarly, it was found that older participants were at higher risk of delivering a preterm baby, but the risk was minimal (OR = 1.05, 95% CI: 1.02-1.08). Women with a history of abortions had a 1.69-fold excess risk of preterm delivery (95% CI: 1.21-2.35) compared with their counterparts. Those women with a family history of preterm delivery had

Predictor	Preterm Delivery		
	Adjusted OR	95% CI	P value
Coffee consumption (cup/			
No intako	1.00		
	1.00	0.89-1.96	0 164
	1.52	0.90-2.38	0.104
>3 cups	0.72	0.40-1.29	0.271
Tea consumption (cup/			
day)	1.00		
	1.00	0.70 1.00	0.204
	1.12	0.79-1.82	0.394
2 cups	0.89	0.45-1.14	0.157
>3 cups	1.43	0.88-1.94	0.195
Emotional state during			
Happiest time of life	1.00		
Happy with few problems	1.63	1.09-2.44	0.018
Unhappy	2.35	1.49-3.72	0.005
Parity			
Yes	1.00		
No	3.82	2.58-5.64	0.005
Abortion			
No	1.00		
Yes	1.69	1.21-2.35	0.002
Inter-pregnancy interval			
(years)	1.00		
<2	1.00	1 10 2 /9	0.017
<2	1.72	1.10-2.69	0.017
Color			
White	1.00		
Black	2.87	1.35-6.10	0.006
Family history of preterm			
delivery			
No .	1.00		
Yes	2.45	1.33-4.66	0.004
DM			
No	1.00		
Yes	2.22	1.06-4.66	0.035
Pregnancy resulted from			
sub-fertility treatment			
No	1.00		
Yes	12.14	2.39-61.62	0.003

Table 5AdjustedOddsRatiosforPredictorVariablesAssociated with Preterm Delivery

(Continued)

|--|

Predictor	Preterm Delivery			
	Adjusted OR	95% CI	P value	
<b>Iron consumption</b> No Yes	1.46 1.00	1.06 -2.03	0.022	
Folic acid consumption No Yes	1.00 2.45	1.33-4.52	0.004	
Age	1.05	1.02-1.08	0.001	

an excess risk of 2.45 times of preterm delivery (95% CI: 1.33–4.66). Women who consumed folic acid during pregnancy had nearly a 2.5-fold increase in the chance of preterm delivery compared with their counterparts (OR 2.45, 95% CI: 1.33–4.52). In contrast, women who did not consume iron during pregnancy had a 1.46-fold increase in the risk of preterm delivery compared with their counterparts (OR=1.46, 95% CI: 1.06–2.03). A short inter-pregnancy interval of less than two years seemed to increase the risk of preterm delivery by 1.72 folds (95% CI: 1.10–2.69). Diabetics, gestational and otherwise, were at higher risk of delivering a preterm baby (OR = 2.22, 95% CI: 1.06–4.66). After controlling for potential confounders, coffee and tea consumption during pregnancy was not associated with an increased risk of preterm delivery (Table 5).

### Discussion

Coffee and tea contain a variety of compounds, caffeine being the main pharmacological ingredient.<sup>1,8</sup> This study was conducted to assess the association between coffee and tea consumption; as surrogates for caffeine; and preterm delivery in women from the north of Jordan. The hypothesis was that coffee and tea consumption during pregnancy is an independent risk factor for preterm delivery. However, this study did not confirm the finding of an association between coffee and tea consumption during pregnancy and preterm deliveries. This is in agreement with the growing evidence that coffee and tea consumption in general, and coffee, in particular, is not a risk factor of preterm delivery.<sup>1,3–7</sup>

The results of this study indicated that the percentage of respondents who reported no coffee or tea consumption

during pregnancy was 60.3% and 44.9%, respectively. This result was consistent with the findings of Wierzejska et al (2019) who indicated that coffee consumption was declared by almost 43% of the study sample.<sup>2</sup> The relatively low consumption of coffee and tea in the current study could be due to the decision to decrease the consumption during pregnancy for fear of any detrimental effects. However, different international studies<sup>9,10</sup> indicate a higher consumption of both coffee and tea during pregnancy than what was reported in the current study.

The current study found that the association between tea consumption and the increased risk of preterm delivery was close to the point of significance in univariate analysis (p = 0.058), but the results of the logistic regression analysis failed to find such a close association. Besides, the results of the logistic regression analysis did not follow the dose-response criterion, as the estimated risk associated with the intake of one cup of tea during pregnancy was higher than the risk associated with the intake of two cups of tea. In fact, in Table 1 the association between tea consumption and preterm labor is very subtle (P = 0.058). Since there are various kinds of tea leaves and coffee varieties worldwide, which contain different ingredients, the type of tea or coffee may play a role in affecting the results. Further research studies are recommended to assess the relationship between drinking tea or coffee varieties with preterm delivery.

The results of this study are not consistent with the findings of Lei et al who concluded that tea drinking resulted in increased risk of preterm delivery (adjusted OR = 1.36, 95% CI: 1.09–169) and specifically green tea (adjusted OR = 1.42, 95% CI: 1.08-1.85).<sup>11</sup> This study found that decreasing age of starting tea drinking (less than 20 years, adjusted OR = 1.60, 95% CI: 1.17-2.20) and increasing duration (*p* for <0.01) increased the risk of preterm delivery.

The results of the present study are consistent with the findings of Linn et al, who conducted a cross-sectional study and reported that heavy coffee consumption did not increase the risk of preterm delivery.<sup>12</sup> In contrast, a case– control study by Pastore and Savitz found that caffeine consumption during pregnancy was associated with an increased risk of preterm delivery.<sup>13</sup> Similarly, a Canadian survey by McDonald et al showed a slight increase in the risk of preterm delivery among coffee consumers.<sup>14</sup>

The logistic regression of this study has provided some evidence for an association between preterm birth and several socioeconomic and medical factors such as older maternal age, history of abortions, family history of preterm deliveries, history of infertility treatment, diabetes, emotional difficulties, short inter-pregnancy interval, no iron consumption and using folic acid during pregnancy. These findings provide further evidence of different etiologies for preterm delivery.<sup>15</sup>

The result of the current study indicated that folic acid consumption increased the risk of preterm delivery. The results from different epidemiologic studies assessing folic acid supplementation and the risk of preterm birth are inconsistent.<sup>16</sup> Studies showed that higher folic acid significantly consumption was associated with a decreased risk of preterm delivery.<sup>16</sup> However, Sengpiel and colleagues found no protective effect of folic acid consumption against preterm birth.<sup>17</sup> there was an indication that pre-Furthermore. conceptional folic acid supplementation was associated with higher risk of preterm delivery. The same authors recommended future studies to assess the association between folic acid and preterm delivery.<sup>17</sup>

The observed effect of demographic factors adds to the increasing evidence of a higher prevalence of health problems during pregnancy among manual social classes,<sup>18,19</sup> among women with poor nutrition, as well, and among women with adverse life events, through catecholamine release<sup>20</sup> also among patients with lower genital tract infection.<sup>21,22</sup> More clinical research is required to further explore possible causal pathways.

### Conclusion

These results do not support an association between coffee and tea consumption and preterm delivery.

### **Data Sharing Statement**

The quantitative data regarding all variables that were measured in the current study are available from the corresponding author upon request.

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### Disclosure

The authors report no conflicts of interest for this work.

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