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Combined effects of maternal age and parity on successful initiation of exclusive breastfeeding

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ABSTRACT

Maternal age at first childbirth has increased in most developed countries in the past 20 years. The purpose of this study is to investigate effects of maternal age at delivery and parity on successful initiation of exclusive breastfeeding (EBF). This retrospective study investigated 1193 singleton dyads with vaginal-delivered at 37–42 gestational weeks during January and December in 2011 at one large "Baby-Friendly" certified hospital in Japan. A multivariate logistic regression model was used to evaluate individual and combined effects of maternal age and parity on successful initiation of EBF after adjusted for pre-pregnancy body mass index, gestational weight gain, pregnancy complications, mothers' underlying illness, smoking and alcohol drinking habits, gestational week at delivery, child's sex and nurturing support from grandparents. Success rates of EBF at one month after child delivery was 69.4% in primiparous aged ≥35 (group A: n = 284), 73.5% in multiparous aged ≥35 (group B: n = 268), 74.3% in primiparous aged <35 (group C: n = 432), and 82.3% in multiparous aged <35 (group D: n = 209). Older maternal age and primiparous became independently associated with EBF initiation. The combined effect for successful initiation of EBF was the lowest in group A referent to group D both at discharge and at one month (odds ratio (OR) 5.9, 95% confidence interval (CI): 3.0–11.9, and OR 2.2, 95% CI: 1.4–3.4, respectively). Primiparous mothers in late child-bearing aged 35 years or older are at the greatest risk of EBF initiation.

Introduction

Breastfeeding has become one of the major initiatives in global health in the 21st century (Bartick and Reinhold, 2010; Jones et al., 2003; Merewood et al., 2005; Reniers et al., 1983). There are not only nutritional and immunological benefits to the child but also infant-mother bonding and preventive effect of breast cancer in mothers at a later age are some of the well-documented aspects of breastfeeding (American Academy of Pediatrics, 2012; Horta and Victora, 2013; Ip et al., 2007; Jones et al., 2003). The World Health Organization (WHO) and UNICEF promote the ten steps to successful breastfeeding and recommended up to six months of exclusive breastfeeding (EBF) for all infants (Kramer and Kakuma, 2012; WHO, 2009).

However, the duration of EBF is still unsatisfactory in both developing and developed countries (WHO, 2013). In Japan, according to the most recent National Infants Nutrition Survey 2005 (a 10-yearly nation-wide sampling survey) by the Ministry of Health, Labor and Welfare, the proportion of EBF at one month after delivery was below 50%, even though during pregnancy, 96% of those women intended to initiate EBF (Ministry of Health, Labor and Welfare, 2006).

Previous studies have found that factors such as socioeconomic and employment status, maternal and child characteristics, maternal/family intention and health care management contributed to breastfeeding initiation and/or duration (Dennis, 2002; Jones et al., 2011; Meedya et al., 2010; Thulier and Mercer, 2009). Among those factors, the effect of maternal age on breastfeeding practice is one of the most interesting research targets. This is because in the past 20 years, increasing maternal age at first childbirth in most developed countries has been observed (OECD, 2012).

Notably, in the previous studies, the effects of maternal age on EBF practice are inconsistent (Kaneko et al., 2006; Lande et al., 2003; Senarath et al., 2010; Forde and Miller, 2010; Fisher et al., 2013; Ludvigsson and Ludvigsson, 2005; Hundalani et al., 2013; Amin et al., 2011; Ekström et al., 2003; Guo et al., 2013). Some studies were targeted at early cessation of breastfeeding among younger mothers (Avery et al.,

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1998; Akter and Rahman, 2010; Hauck et al., 2011; Liu et al., 2013). In addition to older maternal age, the effect of parity on breastfeeding makes the evaluation more complicated together with ethnic and cultural influences (Ekström et al., 2003; Hla et al., 2003; Griffiths et al., 2005; Dennis et al., 2013).

According to Population Census in 2013 in Japan, primiparous mothers of 35 years or older is increasing. Hence, the purpose of this study is to evaluate individual and the combined effects of maternal age and parity, specifically first-time delivery ages 35 years or older on successful EBF initiation. The result of the present study would allow us to assess if there is combined effects of primiparous mothers in late childbearing on EBF practice.

Methods

This study was a retrospective hospital-based cohort study using medical records. This study was approved by the ethics committee of Teikyo University School of Medicine, Tokyo, Japan (TU-COI 13-1592).

Participants

We obtained an anonymous dataset of consecutive deliveries between January 2011 and December 2011 extracted from electronic medical records in the Japanese Red Cross Medical Center located in Tokyo metropolitan area which had the second largest number of deliveries in Japan. This hospital was Baby-Friendly Hospital Initiative (BFHI) accredited in 2000 because it has been actively promoting 10-step guideline for successful breastfeeding (WHO, 1998; Hawkins et al., 2015; Cleminson et al., 2015).

After excluding miscarriage (n = 220), preterm birth (n = 253), multiple pregnancies (n = 81) and stillbirths (n = 10), there were 1618 singleton dyads delivered at 37–42 gestational weeks. The proportion of participants who returned for the health checkup was 99.8% (1614/1618). Among these, we excluded mothers who had delivery by caesarean section (n = 267), a low birth weight baby defined as lower than 2500 g (n = 80) and newborns with illness who were forced to separate from their mothers due to admission (n = 119). After excluding 25 mothers with missing data on breastfeeding at one month after delivery, 1193 vaginal-birth singleton dyads were analyzed in the present study.

Data collection

Items retrieved from medical records were maternal age, parity (primipara or multipara), presence/absence of underlying disease of mothers (e.g. cardiac diseases, renal diseases, neurological diseases including epilepsy, psychiatric diseases, gynecological diseases including myoma uteri), maternal lifestyle (smoking and alcohol drinking habits), self-reported pre-pregnancy body weight, body height measured at first medical checkup, body weight measured at admission for delivery, maternal hypertension including pregnancy-induced hypertension (PIH), maternal hyperglycemic disorders including gestational diabetes mellitus (GDM), gestational week at delivery, child's sex and birth weight and grandparental nurturing support by asking mothers if they would receive nurturing support from their parents.

In the present study, maternal hypertension was defined as high blood pressure (i.e. 140/90 mm Hg or higher) before and/or during pregnancy. Maternal hyperglycemic disorders in pregnancy included GDM and overt diabetes in pregnancy (The Japan Society of Obstetrics and Gynecology, 2014; International Association of Diabetes and Pregnancy Study Groups Consensus Panel, 2010).

Definition of EBF outcome measure

In the present study, breastfeeding practice at hospital discharge within 24 h and at one-month after delivery were measured using three categories (EBF, partial breastfeeding and formula feeding). With reference to WHO/UNICEF definition, EBF is defined as infants who were fed with only breast milk from his/her mother or wet nurse through breast feeding or expressed breast milk and no other liquids or solids (except for drops or syrups with nutritional supplements or medicine) were given to the infants (WHO, 2008). Otherwise, we ascertained as partial breastfeeding excluding formula only fed infants (Labbok and Krasovec, 1990). Because breastfeeding duration is substantially affected by breastfeeding outcomes in the first postpartum month (Baxter et al., 2009), we particularly focused on EBF initiation at the one month after delivery.

In Japan, mother and newborn dyads discharge from hospital around day 5 after delivery and it is compulsory for mothers to make an appointment for health checkup 1-month after delivery at the hospital where they delivered. At the 1-month health checkup visit, nutritional status which includes breastfeeding practice for mothers and child dyads are assessed.

Statistical analyses

Characteristics among four combination of maternal age and parity are statistically compared based on t-test or Wilcoxon rank-sum test for continuous variables and chi-square test for categorical variables: group A in primiparous mothers aged ≥35 (n = 284), group B in multiparous mothers aged ≥35 (n = 268), group C in primiparous mothers aged <35 (n = 432) and group D in multiparous mothers aged <35 (n = 209).

Pre-pregnancy body mass index (BMI) was calculated based on weight in kilograms (kg) divided by height in square meters (sqm). BMI was categorized according to the WHO classification: underweight (<18.5), normal weight (18.5–24.9), overweight (25.0–29.9) and obese (≥30.0). The proportion of Japanese obese adults is small relative to Western countries among the Organization for Economic Cooperation and Development (OECD), therefore, the Japan Society for the Study of Obesity defined obesity as BMI ≥ 25. Based on this definition, in the present study, two higher categories of WHO classification were amalgamated into: overweight and obese (25.0 ≤ BMI). Gestational weight gain (kg) was computed as a difference between pre-pregnancy body weight and body weight at admission for delivery.

To evaluate both individual effects and combined effects of maternal age of 35 years or older and parity, logistic regression models (i.e., did not initiate EBF = 1 vs. successfully initiated EBF = 0) were used to compute odds ratios (ORs) with 95% confidence intervals (CIs). Stepwise multivariate logistic regression models (SLENTRY = 0.20, SLSTAY = 0.20) were used while adjusting for pre-pregnancy BMI, gestational weight gain, maternal hypertension including PIH, maternal hyperglycemia including GDM, underlying illness of mothers, smoking and alcohol drinking habits, gestational week at delivery, child's sex and nurturing support from grandparents.

All data was analyzed using SAS statistical software version 9.3 (SAS Institute Inc.) where two-sided P values of less than 0.05 were considered statistically significant.

Results

Table 1 shows participants' characteristics based on the four combination groups of maternal age and parity. The mean maternal age difference is 8.1 years (P < 0.001) in primiparous mothers (i.e., Group A minus Group C) is 6.9 years (P < 0.001) in multiparous mothers (i.e., Group B minus Group D). There were significant differences among four groups excluding child's sex. Underlying maternal disease and pregnancy complications were the most frequent in Group A. Mothers in Group A were also more likely to have cigarette smoking and alcohol drinking habits.

In terms of successful initiation of EBF, younger mothers under 35 years had higher success rates of EBF both at discharge (88.5%) and