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Factors affecting breast-feeding initiation in Greece: What is important?

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ABSTRACT

Objective: to investigate the association between breast-feeding initiation and socio-demographic, lifestyle-related, clinical and lactation-related factors in a sample of mothers living in Greece.
Design: cross-sectional study.
Setting: Tertiary University Hospital, maternity ward.
Participants: 428 mothers were interviewed (43.2% response rate) from February until December 2009, using a structured face-to-face questionnaire after at least 24 hours from childbirth.
Measurements and findings: 71.0% of mothers were Greeks and 29.0% immigrants; the mean age was 32.0 years. 44.4% initiated exclusive breast feeding, 7.9% artificial milk -feeding and 47.7% partial feeding. In the multivariate analysis, exclusive breast feeding was inversely related to maternal body mass index (BMI) at the beginning of gestation (odds ratio (OR)=0.93, 95% confidence intervals (95%CI)=0.89–0.98) and caesarean section (OR=0.54, 95% CI=0.35–0.84). Lactation-related factors which favourably affected exclusive breast-feeding initiation included previous breast-feeding experience (OR=2.29, 95% CI=1.39–3.78), information about breast feeding (OR=2.38, 95% CI=1.41–4.01) and rooming-in (OR=1.62 95% CI=1.03–2.54), whilst any breast feeding was favourably affected by encouraging women to breast feed (OR=5.42, 95% CI=1.90–15.50), providing information about breast feeding (OR=6.92, 95% CI=2.53–18.89), and rooming-in (OR=6.93 95% CI=2.01–23.88), and negatively associated with caesarean section (OR=0.11, 95% CI=0.03–0.39). Being an immigrant mother was also positively associated with any breast-feeding initiation (OR=7.97, 95% CI=1.02–62.19). Maternal age, education and income, as well as, smoking status, were not associated with any breast-feeding initiation.
Key conclusions: maternal BMI and immigrant status, information provided by midwives and encouragement, rooming-in and mode of childbirth (caesarean section), were found to be important for breast-feeding initiation in this study population. No other indicator of socio-demographic status was found to be associated with breast-feeding initiation.
Implications for practice: focus should be given to pregnant women with higher BMI at the beginning of pregnancy, and women who had undergone caesarean section. Breast-feeding information and encouragement should be provided to all women in the maternity ward, along with the dedicated practice of rooming-in, in order to promote and increase breast-feeding initiation rates.

Introduction

When the life-changing event of giving birth moved from the domestic environment to the hospital, mothers were attended by nurses and physicians in somewhat more restrictive surroundings (Leavitt, 1986; Spear, 2006), instead of being cared for by other

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women, family, and close friends in the more familiar setting of their home (Lothian, 2001). The consequent development of exclusive maternity wards contributed to the reclaim of a more family-centred attitude towards childbirth, which is now accepted as the prevalent approach in Western societies.

In this context, the psychosocial advantages of breast feeding began to emerge, along with significant nutritional, developmental, and immunologic benefits for the newborns, and additional health benefits for the mothers (American Academy of Pediatrics, 1997; Dennis, 2001). In parallel, it became evident that breast feeding was severely undermined by the marketing of breastmilk substitutes and that protection of breast feeding was crucial. Consequently, protecting, supporting and promoting breast feeding became a public health priority (Kimbro, 2006). A number of international policies and initiatives were developed mainly by the World Health Organization and UNICEF, including the 'Innocenti Declaration on the Protection, Promotion, and Support of Breastfeeding' and the Baby-Friendly Hospital Initiative (WHO/UNICEF, 1992, 1990), and were endorsed by individual governments and professional associations throughout the world.

Thus, breast feeding is now universally accepted as the optimal way to nourish and nurture infants (Kruse et al., 2005), and it is recommended that infants are exclusively breast fed for the first six months of their lives (World Health Organization, 1989; American Academy of Pediatrics, 1997; U.S. Department of Health and Human Services, 2000; WHO/UNICEF, 2003). Although optimal breast-feeding practice is not completely determined by what happens in the maternity ward, exclusive breast feeding at discharge is considered a prerequisite for positive end-points (Kruse et al., 2005).

A number of international studies have associated breast-feeding initiation with various socio-demographic and lactation-related parameters and conditions (Dennis, 2001; Swanson and Power, 2005; Heck et al., 2006; Bolling et al., 2007; Kimbro et al., 2008; Henderson and Redshaw, 2011). Different trends in infant feeding practices may be present, either in the same country, or between countries with similar societal composition (i.e. multiculturalism in the USA versus the UK) (Kelly et al., 2006; Merewood, 2006).

Previous studies in Greece have also identified a number of important parameters for the initiation of either exclusive or any breast feeding. These include (a) socio-demographic characteristics, such as maternal age, maternal education and employment, and population density at home, (b) clinical factors, such as mode of childbirth, and multiparity, (c) lactation-related factors such as breast-feeding information, breast-feeding experience and demand-feeding, and (d) hospital practices such as baby-friendly characteristics, rooming-in and infant-to-breast contact in less than 24 hours (Pechlivani et al., 2005; Theofilogiannakou et al., 2006; Bakoula et al., 2007). Among these factors, younger age and lower educational level of the mother, multiparity, breast-feeding information and experience, rooming-in, early infant-to-breast contact, demand feeding, and baby-friendly characteristics of the maternity hospital were found to be positively associated, whereas maternal employment, increased number of people living at the same house, and caesarean section negatively associated with exclusive breast feeding (Pechlivani et al., 2005; Bakoula et al., 2007). Initiation of any breast feeding, on the other hand, was favourably affected by higher maternal education, and negatively influenced by caesarean section (Theofilogiannakou et al., 2006).

The aim of the present study was to investigate the potential association between socio-demographic, lifestyle-related, clinical and lactation-related factors with breast-feeding initiation, primarily exclusive, in a sample of mothers in Greece. The identification of potentially modifiable parameters among these factors could increase the respective breast-feeding initiation rates.

Methods

Study setting and participants

The study was conducted in the maternity ward of a tertiary University Hospital from February until December 2009. The hospital provides gynaecological and maternity services to women belonging to the Prefecture of Attica, and monitoring of high-risk pregnancies at a nationwide level. During that period, women, who had delivered a child and met the eligibility criteria (permanent inhabitants of Greece and basic understanding of the Greek language) were approached by the first author after 24 hours from childbirth, when the mother was expected to be in good condition to withstand an interview, and before she was discharged from the hospital (the average nationwide in-patient stay in the maternity ward is four days), and asked to participate in the study.

The final sample size was primarily determined by time restrictions, as it was mandatory to complete the recruitment within the aforementioned time period, and include as many mothers as possible. From a total of 990 women, who were initially approached, 428 women agreed to participate in the study. Nevertheless, information, albeit limited, was also provided from the mothers who refused to participate in the study.

The study protocol was approved by the Ethics Committee of the University of Athens. All participants were asked to sign an informed consent form before being enroled in the study.

Data collection

Information about the initiation of breast feeding or other modes of infant feeding, as well as potentially related characteristics/factors was collected through a structured questionnaire by means of a face-to-face interview. The study questionnaire consisted of five sections: (a) a section associated with the lactation status of the specific newborn/s (seven items), (b) a section associated with the gestation/childbirth of the specific newborn/s (eight items), (c) a section related to the past medical/gynaecological history of the mother (two items), (d) a section for general information (three items), and (e) socio-economic characteristics (12 items).

The selection of the variables included in each section was based on prior knowledge derived from respective studies investigating a similar research hypothesis, as well as on our intention to explore further the respective parameters in the Greek setting. The questionnaire included both open-ended and closed questions and the interviews typically lasted for about 30 minutes. Basic information was also collected from the mothers who refused to participate in the study, to allow comparison with those agreeing to participate.

Definition of infant feeding

Three categories of infant feeding were defined: exclusive breast feeding, artificial milk feeding and partial breast feeding. Exclusive breast feeding was considered to take place when an infant was receiving only breastmilk (or expressed breastmilk) and no other liquids or solids, with the exception of drops or syrups consisting of vitamins, mineral supplements, or medicines. Artificial milk feeding consisted of the delivery of liquid food to an infant from a bottle with a nipple/teat. Newborns receiving either a combination of breastmilk and artificial milk, or additional liquids such as tea, infusions, and oral rehydration salts were classified as belonging to the partial breast-feeding category (World Health Organization, 1991). The initiation of breast feeding (exclusive or partial) was considered as positive if the mother had

answered that she was breast feeding her newborn at the time that the interview took place.

Statistical analysis

Descriptive statistics were initially estimated and the χ^2 test was used. Student's *t*-test for independent samples was specifically used to determine the association between body mass index (BMI), as well as maternal age, and breast-feeding initiation (exclusive or exclusive and partial). In addition, the paired *t*-test was used to compare BMI at the beginning of gestation with the respective BMI before childbirth. In the bivariate analysis, socio-demographic parameters, life-style and lactation-related variables, as well as clinical factors were associated with breast-feeding initiation (exclusive or exclusive and partial), on the basis of prior knowledge deriving from the relevant literature.

Multivariate logistic regression models were used to quantify the association between variables of interest (either deriving from the bivariate analyses, or based on the relevant literature) and breast-feeding initiation. The dependent variable was defined in a binary way (0, 1). Two different categorisations of the dependent variable were used. In the first model (representing the primary analysis of interest) value '1' indicates exclusive breast feeding, whereas '0' indicates artificial milk only or partial breast feeding. In the second model (representing the secondary analysis) value '1' indicates exclusive or partial breast feeding (henceforth referred as any), and '0' indicates artificial milk feeding only.

All analyses were performed using SPSS version 17.0. Statistical significance was accepted at the level of 0.05.

Table 1
Baseline characteristics of participating ($n=428$) and non-participating ($n=562$) mothers in the study.

Baseline characteristics	Study participants		Non-responders	
	n	(%)	n	(%)
Age				
Mean (SD)*	32.0	(4.7)	31.9	(4.7)
Pre-pregnancy BMI				
Mean (SD)†	23.4	(4.19)	–	–
Nationality				
Greek	304	(71.0%)	382	(69.2%)
Immigrant	124	(29.0%)	170	(30.8%)
Missing	–	–	10	
Employment status				
Employed	311	(73.4%)	357	(75.6%)
Domestically occupied	87	(20.5%)	93	(19.7%)
Unemployed	26	(6.1%)	22	(4.7%)
Missing	4		90	
University/College education				
Yes	262	(61.2%)	281	(60.2%)
No	166	(38.8%)	186	(39.8%)
Missing	–	–	95	
Infant feeding mode				
Exclusive/any breast feeding	394	(92.1%)	501	(91.4%)
Artificial milk	34	(7.9%)	47	(8.6%)
Missing	–	–	14	

* In years.
† In kg/m$^{2.}$

Findings

Characteristics of participants and non-participants

From a total of 990 women, who were initially approached, 428 women agreed to participate in the study (response rate 43.2%). These mothers had given birth to 418 singleton and 20 twin babies. Baseline characteristics of the study sample and the non-participating mothers are shown in Table 1.

Exclusive breast feeding was initiated by 44.4% ($n=190$), artificial milk feeding by 7.9% ($n=34$), and partial breast feeding by 47.7% ($n=204$) of study participants. The mean maternal age was similar between the two groups (32.0 versus 31.9 years for participating and non-participating women, respectively), and the same applied for the percentages regarding the employment (73.4% versus 75.6%) and immigrant (29.0% versus 30.8%) maternal statuses. Finally, the proportion of women who initiated breast feeding (exclusive or any) was also similar in the two groups (92.1% versus 92.4%).

Socio-demographic factors and breast feeding

The mean maternal age was 32.0 (± 4.7) years. Maternal age was not associated either with exclusive or any breast-feeding initiation ($t=-0.355$, df=432, $p=0.723$, and $t=1.464$, df=432, $p=0.144$, respectively).

71.0% of mothers were Greeks and 29.0% immigrants. The respective percentages for the fathers were 73.5% and 26.5%. 96.0% of women were married. In the bivariate analysis neither being an immigrant mother ($p=0.321$ and 0.807 for exclusive and any breast feeding, respectively) nor being an immigrant father ($p=0.091$ and 0.964) was associated with breast-feeding initiation (Tables 2 and 3).

Regarding their educational level, a high percentage of mothers (61.2%) and fathers (47.0%) had a University or College degree. This percentage is higher than previously published data in the general population of women in Greece (Athanasiadis et al., 2007), yet not unexpected altogether, as the study population represents younger women, living in the urban area of the Prefecture of Attica. Nonetheless, neither the educational level of the mother ($p=0.133$ and 0.054 for exclusive and any breast feeding, respectively), nor the respective level of the father ($p=0.261$ and 0.170 for exclusive and any breast feeding, respectively), were significantly associated with the feeding mode of the infant.

As far as the maternal employment status was concerned, 73.4% of women were employed during their pregnancy, 20.5% were domestically occupied and 6.1% were unemployed. Most women (62.2%, $n=191$) worked in the private sector. Maternal employment was not associated with breast-feeding initiation ($p=0.893$ and 0.714 for exclusive and any breast feeding, respectively).

A total of 54.2% of study participants had a monthly net household income between 500–2000€, whereas 45.8% earned more than 2000€; 30.5% were not paying mortgage or rent, 45.7% were renting, and 23.8% were paying out mortgages. Net household income did not prove to be statistically significant with regard to breast-feeding initiation ($p=0.327$ and 0.168 for exclusive and any breast feeding, respectively). The same also applied for the association between mortgage/rent payments and the initiation of breast feeding ($p=0.701$ and 0.438 for exclusive and any breast feeding, respectively).

Nearly one quarter of the mothers reported that they expected help from their own mother in raising their child, and 31.0% support from at least two categories of persons (mother/mother-in-law/sister/baby sitter/nursery). Nevertheless, lack of home support was not associated with either exclusive or any breast-feeding initiation ($p=0.962$ and 0.347 for exclusive and any breast feeding, respectively).

Lifestyle-related factors and breast feeding

Sixty-nine per cent of mothers were non-smokers, and 91.5% ($n=400$) reported that they were not smoking during their

Table 2
Socio-demographic, lifestyle-related, clinical, and lactation-related determinants of exclusive breast-feeding initiation (bivariate analysis) [bold values indicate statistically significant results] ($n=438$).*

Variable	Exclusive breast feeding		*p*-Value
	Yes	No	
Immigrant mother	50 (39.7%)	76 (60.3%)	0.321
Immigrant father	43 (36.8%)	74 (63.2%)	0.091
University/College education (mother)	123 (46.2%)	143 (53.8%)	0.133
University/college education (father)	93 (46.3%)	108 (53.7%)	0.261
Maternal employment	139 (43.6%)	180 (56.4%)	0.893
Mortgage/rent payment	135 (44.0%)	172 (56.0%)	0.701
Lack of home support	64 (43.5%)	83 (56.5%)	0.962
Regular smoking before pregnancy	55 (40.1%)	82 (59.9%)	0.357
Maternal health problems	52 (37.4%)	87 (62.6%)	0.086
Newborn health problems/prematurity/low birth weight	45 (44.1%)	57 (55.9%)	0.864
Multiparity	30 (57.7%)	22 (42.3%)	**0.029**
Caesarean section	76 (34.5%)	144 (65.5%)	< **0.001**
Breast-feeding experience	105 (54.1%)	89 (45.9%)	< **0.001**
Breast-feeding information	148 (48.2%)	159 (51.8%)	**0.002**
Breast-feeding encouragement	167 (44.8%)	206 (55.2%)	0.159
Rooming-in	104 (50.5%)	102 (49.5%)	**0.005**

* A variable for multiplicity has not been included, as no twin pair had been exclusively breast fed.

Table 3
Socio-demographic, lifestyle-related, clinical, and lactation-related determinants of any breast-feeding initiation (bivariate analysis) [bold values indicate statistically significant results] ($n=438$).

Variable	Any breast feeding		*p*-Value
	Yes	No	
Immigrant mother	116 (92.1%)	10 (7.9%)	0.807
Immigrant father	107 (91.5%)	10 (8.5%)	0.964
University/college education (mother)	249 (93.6%)	17 (6.4%)	0.054
University/college education (father)	188 (93.5%)	3 (6.5%)	0.170
Maternal employment	293 (91.8%)	26 (8.2%)	0.714
Mortgage/rent payment	279 (90.9%)	28 (9.1%)	0.438
Lack of home support	132 (89.8%)	15 (10.2%)	0.347
Regular smoking before pregnancy	126 (92.0%)	11 (8.0%)	0.832
Maternal health problems	126 (90.6%)	13 (9.4%)	0.642
Newborn health problems/prematurity/low birth weight	88 (86.3%)	14 (13.7%)	**0.029**
Multiplicity	14 (70.0%)	6 (30.0%)	< **0.001**
Multiparity	43 (82.7%)	9 (17.3%)	**0.015**
Caesarean section	191 (86.8%)	29 (13.2%)	< **0.001**
Breast-feeding experience	177 (91.2%)	17 (8.8%)	0.832
Breast-feeding information	298 (97.1%)	9 (2.9%)	< **0.001**
Breast-feeding encouragement	353 (94.6%)	20(5.4%)	< **0.001**
Rooming-in	200 (97.1%)	6 (2.9%)	< **0.001**

pregnancy. Among the women who smoked before becoming pregnant, 94.1% were regular smokers ($n=128$). From those who smoked during their pregnancy, 90.6% ($n=29$) were regular smokers. Regular smoking before pregnancy was not associated with the initiation of breast feeding compared to non-smoking before pregnancy ($p=0.357$ and 0.832 for exclusive and any breast feeding, respectively).

BMI, widely used as an index of obesity, reflects the balance between energy intake (e.g. dietary habits) and energy expenditure (e.g. physical activity) (Kvaavik et al., 2004). In the present study, maternal BMI (in kg/m^2) was calculated from self-reports of weight and height. The vast majority of mothers (67.0%, $n=263$) had normal pre-pregnant weight (18.6–256–25), whereas 18.9% ($n=74$) and 7.7% ($n=30$) were classified as overweight (25.1–301–30) or obese (BMI $\geq$ 30.1), respectively, and 6.4% ($n=25$) as underweight (BMI $\leq$ 18.5).

The mean maternal BMI was 23.38 ($\pm$4.19) kg/m^2 at the beginning of gestation and 28.58 ($\pm$4.24) kg/m^2 before childbirth (paired-$t=-52.662$, df=408, $p<0.001$). Exclusive breast feeding was inversely associated to BMI both at the beginning ($t=.794$, df=412, $p=0.005$) and at the end of gestation ($t=3.134$, df=407, $p=0.002$).

Clinical factors and breast feeding

The presence of maternal health problems was not significantly related with the initiation of exclusive ($p=0.086$), or any breast feeding ($p=0.642$). The most commonly reported problem during breast-feeding initiation was sore/traumatised nipples, whereas 65.0% of mothers did not encounter any problem during breast-feeding initiation. In addition 78.0% of the mothers choosing to use artificial milk (alone or in combination with breastmilk) believed that they could not produce enough milk during the first few days of lactation.

The majority of babies (80.3%) were born without any health problem; among the ones that demonstrated such problems, 32.4% ($n=24$) were admitted in a special care baby unit (SCBU), or a neonatal intensive care unit (NICU). The health status of the newborn (presence of health problems, prematurity, or low birth weight) was significantly associated with the initiation of any breast feeding ($p<0.029$).

The percentage of artificial milk only feeding initiation was 7.4% ($n=6$) among singletons and 30.0% ($n=31$) among twins ($p<0.001$), whereas none of the latter breast fed exclusively.

Nevertheless, multiplicity was found to be associated with any breast-feeding initiation ($p < 0.001$).

With respect to the number of births, 48.6% of women were primiparous, 39.4% had two children (including the newborn) and 12.0% had three or more children (including the newborn). Multiparity (three or more children including the newborn) was positively associated with both exclusive ($p = 0.029$) and any breast-feeding initiation ($p = 0.015$).

As far as the mode of childbirth was concerned, the percentage of babies being delivered via caesarean section was remarkably high (50.2% of all deliveries), although in 38.5% ($n = 80$) of the cases the reason was a previous caesarean. Caesarean section was negatively associated with the initiation of exclusive breast feeding ($p < 0.001$).

Lactation-related factors and breast feeding

The majority of the mothers (73.3%) had previous breast-feeding experience with another child; the main causes of previous breast-feeding cessation were lack of sufficient milk supply (34.7%, $n = 52$), followed by normal ablactation (24.0%, $n = 36$) and need to return to work (20.0%, $n = 30$). Previous breast-feeding experience was positively associated with exclusive breast-feeding initiation ($p < 0.001$).

In relation to breast-feeding education, 78.1% of mothers were informed about breast feeding, most commonly by a midwife (97.4%, $n = 297$). Breast-feeding information was typically given after childbirth, during their stay in the maternity hospital (88.7%, $n = 268$), whereas only 17.8% ($n = 54$) of the pregnant women reported that they had received breast-feeding information antepartum. 89.7% of women were encouraged to initiate breast feeding, with 72.0% of encouraged women ($n = 270$) receiving support from at least two categories of persons (health professional/family/friends). Encouragement to breast feed was positively associated with any breast-feeding initiation ($p < 0.001$).

Finally, rooming-in was applied for 47.5% of babies. Staying at the same room with the mother proved statistically significant for the initiation of exclusive ($p = 0.005$) and any ($p < 0.001$) breast feeding.

Multivariate analysis and breast feeding

Tables 4 and 5 show the results from the multivariate regression analyses. Although the immigrant status of the mother did not seem to influence breast-feeding initiation in the bivariate analysis, it was significantly associated with the initiation of any breast feeding (OR = 7.97, 95% CI = 1.02–62.19) after the adjustments performed in the respective multivariate model.

Caesarean section (OR = 0.54, 95% CI = 0.35–0.84) and BMI at the beginning of gestation (OR = 0.93, 95% CI = 0.89–0.98) were both inversely associated with initiation of exclusive breast feeding. Furthermore, caesarean section was also negatively associated with any breast-feeding initiation (OR = 0.11, 95% CI = 0.03–0.39).

Both the processes of informing about breast feeding and encouraging women to breast feed were positively associated with breast-feeding initiation. Indeed, mothers who were informed about the process of breast feeding by a health professional were found more likely to initiate either exclusive (OR = 2.38, 95% CI = 1.41–4.01) or any breast feeding (OR = 6.92, 95% CI = 2.53–18.89). In addition, encouraging women to breast feed was also associated with a higher probability of any breast feeding (OR = 5.42, 95% CI = 1.90–15.50). By contrast, previous breast-feeding experience was positively related to exclusive breast-feeding initiation (OR = 2.29, 95% CI = 1.39–3.78).

Finally, rooming-in also remained significant in the multivariate models and was positively associated with the initiation of exclusive (OR = 1.62, 95% CI = 1.03–2.54) and any breast feeding (OR = 6.93, 95% CI = 2.01–23.88).

Discussion

In a sample of mothers who delivered their newborns in the maternity ward of a tertiary University Hospital in Athens, Greece, we found evidence that having lower BMI, both at the beginning and at the end of pregnancy, was positively associated with the initiation of exclusive breast feeding. Immigrant status, on the other hand, was positively associated with the initiation of any breast feeding, and caesarean section inversely related to both exclusive and any breast-feeding initiation. Informing and encouraging women to breast feed, as well as the practice of rooming-in, were positively associated with breast-feeding initiation. No association was found between maternal age, smoking status, education and family income with the initiation of exclusive, or any breast feeding.

An interesting finding of the present study was the significantly higher rate of exclusive breast feeding, compared to previously conducted studies in Greece (Pechlivani et al., 2005; Bakoula et al., 2007). Indeed, although the percentage of mothers who started to breast feed their babies (92.1%) was comparable to previous reports, almost half (44.4%) had initiated exclusive breast feeding, which exceeds by a large margin the respective reports of previous studies. Nevertheless, the recently conducted first National Survey on Infant Feeding Practices in Greece reported similar trends (87.9% and 45.2% for any breast feeding and full breast-feeding initiation, respectively) (Gaki et al., 2009). This observation is not likely to be associated with the fact that our study population comprised both Greek and immigrant mothers, in contrast to previous studies which either had not included immigrants (Bakoula et al., 2007), or did not identify their respective proportion in the study sample (Pechlivani et al., 2005), as the rates of exclusive breast feeding did not differ among the former groups (data not shown). It appears that Greek maternity wards may be becoming more encouraging towards exclusive breast feeding than previously reported, at least in the setting of a tertiary University hospital, and are gradually bridging the gap between exclusive and any breast feeding.

Maternal age was not associated with breast feeding in this study sample. This finding differs from that of other studies which suggest that younger women are at higher risk of not initiating breast feeding (Dennis, 2001; Bolling et al., 2007). Nevertheless, this association was mainly found among unmarried teenage mothers (Bick et al., 1998; Evers et al., 1998; Hannon et al., 2000; Ogbuanu et al., 2009). In contrast, not only the majority of mothers in our sample were over 27 years of age, but most were also married (96%). Moreover, Bakoula et al. (2007) had even reported a positive influence of younger maternal age on exclusive breast feeding in Greece, and suggested that a demographic shift in the initiation of exclusive breast feeding may be starting to take place.

The percentages of overweight and obese mothers in the present study, based on their pre-pregnancy BMI, were 18.9% and 7.7%, respectively. These findings are in line with previously reported data concerning women of childbearing age in Greece (Manios et al., 2009, Grammatikopoulou, et al., 2013), lower than the respective prevalence of obesity in women of reproductive age in the USA (34%), and similar, albeit slightly better, than the reported data from another typical Southern European country, like Spain (range 5.5–12.4%, by decade of reproductive age) (Flegal et al., 2010; Pérez Rodrigo, 2013). Mothers with higher BMI both at the beginning of gestation, as well as before childbirth, were less likely to initiate exclusive breast feeding. This finding is also in

Table 4
Adjusted odds ratios (OR) and 95% confidence intervals (95% CI) for specific socio-demographic, lifestyle-related, clinical, and lactation-related determinants of exclusive breast-feeding initiation [bold values indicate statistically significant results] ($n=409$).*

Variable	OR	95% CI	
		Lower	Upper
Maternal age†	0.99	0.96	1.03
Pre-pregnancy BMI†	**0.93**	0.89	0.98
Immigrant mother (*ref. Greek*)	1.35	0.53	3.47
Immigrant father (*ref. Greek*)	0.49	0.19	1.27
University/college education (mother) (*ref. high school graduate or lower*)	1.32	0.78	2.23
University/college education (father) (*ref. high school graduate or lower*)	0.99	0.61	1.63
Maternal employment (*ref. unemployed/domestically occupied*)	1.06	0.61	1.84
Mortgage/rent payment (*ref. home owner*)	1.47	0.89	2.41
Lack of home support (*ref. home support*)	0.99	0.62	1.59
Regular smoking before pregnancy (*non-smoker before pregnancy*)	0.71	0.44	1.16
Maternal health problems (*ref. absence of maternal health problems*)	0.78	0.49	1.27
Newborn health problems/prematurity/low birth weight (*ref. absence of related problems*)	1.26	0.74	2.14
Multiparity (*ref. < < 3 children*)	1.92	0.90	4.03
Caesarean section (*ref. vaginal childbirth*)	**0.54**	0.35	0.84
Breast-feeding experience (*ref. previously inexperienced*)	**2.29**	1.39	3.78
Breast-feeding information (*ref. not receiving information*)	**2.38**	1.41	4.01
Breast-feeding encouragement (*ref. not encouraged to breast feed*)	1.33	0.70	2.52
Rooming-in (*ref. rooming-in not practiced*)	**1.62**	1.03	2.54

ref.: reference category.

* A variable for multiplicity has not been included, as no twin pair had been exclusively breast fed

† Maternal age and BMI are considered as continuous variables.

Table 5
Adjusted odds ratios (OR) and 95% confidence intervals (95% CI) for specific socio-demographic, lifestyle-related, clinical, and lactation-related determinants of any breast-feeding initiation [bold values indicate statistically significant results] ($n=409$).

Variable	OR	95% CI	
		Lower	Upper
Maternal age*	1.02	0.93	1.11
Pre-pregnancy BMI*	1.04	0.94	1.15
Immigrant mother (*ref. Greek*)	**7.97**	1.02	62.19
Immigrant father (*ref. Greek*)	0.25	0.03	1.85
University/College education (mother) (*ref. high school graduate or lower*)	2.00	0.67	5.96
University/College education (father) (*ref. high school graduate or lower*)	1.03	0.36	2.93
Maternal employment (*ref. unemployed/domestically occupied*)	0.58	0.19	1.74
Mortgage/Rent payment (*ref. home owner*)	0.75	0.23	2.44
Lack of home support (*ref. home support*)	1.48	0.52	4.23
Regular smoking before pregnancy (*ref. non-smoker before pregnancy*)	0.72	0.26	2.01
Maternal health problems (*ref. absence of maternal health problems*)	1.40	0.50	3.90
Newborn health problems/prematurity/low birth weight (*ref. absence of related problems*)	0.41	0.14	1.16
Multiplicity (*ref. singletons*)	1.02	0.20	5.10
Multiparity (*ref. < 3 children*)	0.53	0.12	2.30
Caesarean section (*ref. vaginal childbirth*)	**0.11**	0.03	0.39
Breast-feeding experience (*ref. previously inexperienced*)	0.92	0.31	2.72
Breast-feeding information (*ref. not receiving information*)	**6.92**	2.53	18.89
Breast-feeding encouragement (*ref. not encouraged to breast feed*)	**5.42**	1.90	15.50
Rooming-in (*ref. rooming-in not practiced*)	**6.93**	2.01	23.88

ref.: reference category.

* Maternal age and BMI are considered as continuous variables.

accordance with other studies (Mehta et al., 2011; Manios et al., 2009; Liu et al., 2010; Kitsantas et al., 2011). In particular, the inverse association between exclusive breast feeding and BMI at the beginning of gestation is gradually supported by a growing amount of scientific evidence (Mehta et al., 2011, Manios et al., 2009; Liu et al., 2010; Kitsantas et al., 2011; Wojcicki, 2011). However, the timing of adiposity gain (pre-pregnancy BMI versus excessive weight gain during pregnancy) may have important effects on maternal physiology, as well as on maternal and infant behavioural factors and needs to be further studied (Wojcicki, 2011). In addition, the concerns of women about body image may be reflected in their weight gain during pregnancy and should also be taken into account. Indeed, data before the outbreak of the economic crisis in Greece show that around 37% of expectant mothers did not reach the recommended weight gain during gestation (Manios et al., 2009). Moreover, women of normal pre-pregnancy body weight in Greece were found to exhibit a better diet quality during pregnancy compared with obese women, again reflecting not only concerns about their body image, but also a more health-conscious attitude towards their dietary patterns (Tsigga et al., 2011).

With regard to the maternal smoking status, the percentage of participants who were regularly smoking before being pregnant was slightly lower (31.0%), but overall similar to recently published

data about the smoking habits of women in Greece (39%) (Vardavas and Kafatos, 2007). Moreover, the vast majority of mothers (91.5%) reported that they were not smoking during their pregnancy, again performing somewhat better than previously published data (83%) (Vardavas et al., 2010). Regular smoking before pregnancy did not prove significant for the initiation of breast feeding ($p=0.357$ and 0.832 for exclusive and any breast feeding, respectively). This result seemingly differs from most published studies, which however, have primarily focused on the association of smoking and early weaning, which in effect refers to the duration of breast feeding, rather than the initiation of this process (Ratner et al., 1999; Letson et al., 2002). Furthermore, it has been suggested that the relationship between maternal smoking and breast-feeding initiation could not be explained through a biological mechanism, but is possibly indicative of the importance of social or behavioural factors in women's infant feeding decisions (Amir and Donath, 2002).

Nevertheless, pregnancy is a time when women are highly motivated to quit smoking in the best interests of their unborn fetus. Hence, quitting smoking during pregnancy is a potential area for huge public health gain in the long term (Giglia et al., 2006). Indeed, almost three out of four mothers in the present study had decided not to smoke during gestation, despite their pre-pregnancy habits. In an effort to decrease the risk of adverse pregnancy outcomes and promote the best possible health outcomes for the infant and the mother, there is a need to design targeted intervention programs for smoking cessation in pregnancy (Lumley et al., 2001), with antenatal care services at all levels in both the public and private sectors supporting these cessation efforts. Moreover, there is a need for support of population-based educational interventions aimed at smoking cessation in both spouses, as well as establishing smoke-free environments in both private and public places (Vardavas et al., 2010).

Caesarean section was inversely associated with initiation of breast feeding in this study (OR=0.54, 95% CI=0.35–0.84, and OR=0.11, 95% CI=0.03–0.39, for exclusive and any breast-feeding initiation, respectively). Most studies indeed agree that caesarean section does not have a favourable effect on breast feeding (Scott et al., 2001; Theofilogiannakou et al., 2006; Prior et al., 2012). In addition, Scott et al. (2001) found that vaginal childbirth is positively related to breast feeding at discharge in a cohort of 1059 Australian women, and Bakoula et al. (2007) and Pechlivani et al. (2005) identified vaginal childbirth as a strong determinant for the initiation of exclusive breast feeding (OR=1.33, and 1.61, respectively). Nevertheless, in a recent review and meta-analysis of the relationship between caesarean childbirth and breast feeding by Chien and Tai (2007), caesarean section was not found to be as a risk factor for breast-feeding initiation.

The results of the present study also stress the importance of health professionals for the initiation of breast feeding. Indeed, the process of informing mothers about breast feeding was a positive factor for exclusive and any breast feeding. Midwives were found to be a key-person in this process, as the related information was provided by them in the vast majority of cases (97.4%). Breast-feeding information and assistance was typically given to women after childbirth during their hospital stay, and mainly involved the correct positioning of the newborn. Obstetricians were also involved in informing mothers about breast feeding during that period, albeit to a significantly lesser extent than midwives.

The role of midwives in the initiation of breast feeding has been previously acknowledged. Pechlivani et al. (2005) stressed the importance of correct and appropriate information on breast feeding, provided by properly trained healthcare professionals, specializing in breast-feeding counselling, for the initiation of exclusive breast feeding, and identified midwives as the key-persons influencing the respective practice (OR=1.40, 95% CI=0.80–2.45). Lee et al. (2009) reported that the personal interaction with a nurse or midwife following childbirth was a significant predictor of breast-feeding initiation. Henderson and Redshaw (2011) found that all stages of breast feeding, including initiation, were significantly associated with receiving consistent advice from midwives, deeming their contribution influential, after adjusting for socio-demographic and clinical factors. Finally, Swanson and Power (2005) reported that midwives and nurses have a crucial role in communicating positive views on breast feeding to new mothers at different time points. Given that the most commonly reported problem by mothers in the present study was sore/traumatised nipples, and that 78.0% of mothers choosing to use artificial milk (alone or in combination with breast milk) believed that they could not produce enough milk during the first few days of lactation, the role of hospital staff well-informed in breast feeding cannot be overemphasised. By contrast, midwives and nurses should be encouraged to capitalise on their influence towards women after labour, and provide consistent advice, practical help, and active support for the initiation of breast feeding.

In addition, the contribution of midwives in the initiation of lactation seems essential to counterbalance for the lack of the necessary breast-feeding knowledge to support breast feeding, which has been reported for clinicians in other studies (Howard et al., 1997; Schanler et al., 1999). Comprehensive breast-feeding promotion programs incorporated in residency curricula could be used to address the former discrepancy.

Similarly, encouraging women to breast feed was associated with a significantly greater likelihood of any breast feeding. The vast majority of mothers (89.7%) were encouraged to initiate breast feeding, often by more than one category of persons (72.0%). Hence, motivating mothers to breast feed seems hugely influential to their final choice, and social support is an important factor in the decision to breast feed, albeit manifested differently across ethnic and racial groups (Baisch et al., 1989; Matich and Sims, 1992; Maehr et al., 1993). Indeed, Baranowski et al. (1986) reported that friends' support was important in the decision to breast feed among African-Americans, compared to the support of the grandmother among Hispanics, whereas the partner's opinion was deemed important among Anglo-Americans in the study of Freed et al. (1992), a finding also reported by Scott et al. (2001) in their study of Australian mothers. Therefore, counselling and educational material to promote breast feeding need to utilise peers, role models, and family (i.e. mother, partner) so they could provide the emotional and practical support which is required by mothers for initiating breast feeding.

The latter may also prove important for the mothers' future breast-feeding behaviour, as women with previous breast-feeding experience were more likely to initiate exclusive breast feeding compared with their counterparts who lacked the related experience, according to the results of the present study, and it would favour the promotion of breast-feeding initiation, if that experience were a positive one. Hence, even though having more than one child may be a deterrent factor for breast feeding (Scott et al., 2001), having breast fed at least one child before is not. A similar result was also reported by Bolling et al. (2007), who found that mothers who had breast fed their previous child for six weeks or more were most likely intending to breast feed their newborn, with their intentions being an excellent proxy for their actual initial feeding behaviour.

Rooming-in was found to be positively associated with exclusive breast-feeding initiation (OR=1.62, 95% CI=1.03–2.54), as well as any breast feeding (OR=6.93, 95% CI=2.01–23.88), albeit being implemented in only about half of the newborn population. The latter suggests that the Baby-Friendly Hospital Initiative was

not fully incorporated in Greek maternity wards, even in the setting of a tertiary University hospital during the period of the present study. However, significantly more mothers ($p < 0.001$) who were not staying at the same room with the newborn initiated exclusive artificial milk feeding (13.4%, $n=31$), whereas women who stayed in the same room with their babies were much less likely to initiate artificial milk feeding (2.9%, $n=6$). Taken together the aforementioned findings confirm the importance of rooming-in as a basic pillar of the Baby-Friendly Hospital Initiative. The importance of rooming-in as a strong determinant for the initiation of exclusive breast feeding has also been acknowledged in previous Greek studies (Pechlivani et al., 2005; Bakoula et al., 2007).

Among the socio-demographic factors which were investigated in the present study, the immigrant status of the mother was significantly associated with the initiation of any breast feeding. And although breast feeding has always been considered an emphatic symbol of motherhood in Greece, it presents women today with choices, desires, obligations, and constraints in the context of a modern Western society (Guttman and Zimmerman, 2000).

The positive association between immigrant status and the initiation of any breast feeding in the present study, though previously reported in US studies (Singh et al., 2007; Kimbro et al., 2008), has not been thoroughly investigated in Southern Europe, and could be considered potentially important, as the respective societies are not multiculturally structured per se, as for instance in the USA, or the UK, and cultural norms regarding close family bonding and breast feeding are considered prevalent.

However, since the early 1990s immigrants have become a regular part of the Greek society. Indeed, the recorded percentage of immigrant population in the last census was 8.4% (National Statistical Service of Greece, 2013a). The percentage of immigrant mothers in the study sample of the first National Survey of Infant Feeding Practices reached 14.5%, although the respective status was not found to be associated with breast-feeding initiation (Gaki et al., 2009). In addition, the relatively high percentage of immigrant mothers in the present study (29.0%) reflects the respective composition of the urban population in the Prefecture of Attica, along with the high attendance rate of immigrant women in Greek public maternity clinics.

Nonetheless, the observed association between the immigrant status of the mother and the initiation of breast feeding may reflect the fact that immigrant mothers in Greece come from families and communities, where breast feeding is by far the predominant infant feeding method.

It should be noted that a total of 54.2% of study participants reported a monthly net household income between 500 and 2000€. The amount of 2000€ represented the least monthly expenditure of poor households in the year the study was conducted (National Statistical Service of Greece, 2012a), with approximately 15.3% of the Greek population reportedly facing the danger of poverty in the same year (National Statistical Service of Greece, 2012b). Hence, more women in our study sample belonged to the lower economic classes compared to the general population, and the initiation of breast feeding could have been negatively affected. That is because the ability to afford artificial milk -feeding in the context of a Western society is thought to be inversely associated with use of the artificial milk (Heck et al., 2006).

Interestingly, however, the net household income did not seem to be significantly associated with the initiation of breast feeding, as mothers appeared to breast feed irrespective of a net household income of less or higher than the cut-off criterion (2000€), whereas other financial parameters, such as paying out mortgage or rent also failed to demonstrate significant association with the initiation of breast feeding. Hence, the marked economic gradient with regard to breast-feeding initiation, which had been identified in previous studies in the USA and Canada (Matthews et al., 1998; Heck et al., 2006), was not confirmed in the present study. It is quite possible that cultural norms in Southern Europe both among native and immigrant mothers outweigh the connotation of social class deprivation, with regard to initiating artificial milk feeding, and dictate at least an attempt to start breast feeding the newborn, perhaps due to a perceived link between good mothering and breast feeding (Carter,1996).

Naturally, the impact of the recent economic crisis in Greece on childbirth and childrearing cannot be ignored, as the respective decline reached 14.9% (National Statistical Service of Greece, 2011; National Statistical Service of Greece, 2013b). However, the implication of our findings is that despite the significant decline of the socio-economic status of the middle and lower class in Greece in the last three years, the initiation of breast feeding is not likely to be significantly affected.

Limitations of the present study include its cross-sectional design, and single-centre setting. Nevertheless, the study was conducted in a busy maternity ward at a tertiary University hospital, which serves a sizeable catchment population from the Prefecture of Attica, and accepts referrals of high-risk pregnancies at a nationwide level.

It should also be mentioned that the number of mothers who initiated artificial milk feeding only were relatively few compared to the overall sample size (34 mothers in a total of 428). Hence, the results of the analysis comparing initiation of any breast feeding with artificial milk feeding only should be interpreted with caution. Nevertheless, the aim of the present study was primarily to investigate the factors which were associated with the initiation of exclusive breast feeding rather than any, thus outweighing the aforementioned limitation.

Conclusion

The present study sought to investigate the potential association between breast-feeding initiation and socio-demographic, lifestyle-related, clinical and lactation-related factors in a typical Southern European country like Greece, and explore how susceptible these factors may be to public health policies, in light of the new economic reality present in Southern Europe.

The results of the study confirmed the importance of maternal pre-pregnancy BMI, caesarean section, previous breast-feeding experience, informing and encouraging women to breast feed, rooming-in and immigrant status for the initiation of breast feeding. Other indicators of socio-economic status were not associated with breast-feeding initiation, suggesting that the significant economic crisis experienced by the middle and lower classes in Greece during the last three years may not be reflected in mothers' decisions to breast feed.

Conflict of interest

None declared. The authors have no financial interests, and have not received any financial support for this article.

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