Original Article

Pathways of equality through education: impact of gender (in)equality and maternal education on exclusive breastfeeding among natives and migrants in Belgium

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Abstract

Even though breastfeeding is typically considered the preferred feeding method for infants worldwide, in Belgium, breastfeeding rates remain low across native and migrant groups while the underlying determinants are unclear. Furthermore, research examining contextual effects, especially regarding gender (in)equality and ideology, has not been conducted. We hypothesized that greater gender equality scores in the country of origin will result in higher breastfeeding chances. Because gender equality does not operate only at the contextual level but can be mediated through individual level resources, we hypothesized the following for maternal education: higher maternal education will be an important positive predictor for exclusive breastfeeding chances in Belgium, but its effects will differ over subsequent origin countries. Based on IKAROS data (Geïntegreerd Kind Activiteiten en Regio Ondersteunings Systeem), we perform multilevel analyses on 27 936 newborns. Feeding method is indicated by exclusive breastfeeding 3 months after childbirth. We measure gender (in)equality using Global Gender Gap scores from the mother's origin country. Maternal education is a metric variable based on International Standard Classification of Education indicators. Results show that 3.6% of the variation in breastfeeding can be explained by differences between the migrant mother's country of origin. However, the effect of gender (in)equality appears to be non-significant. After adding maternal education, the effect for origin countries scoring low on gender equality turns significant. Maternal education on its own shows strong positive association with exclusive breastfeeding and, furthermore, has different effects for different origin countries. Possible explanations are discussed in-depth setting direction for further research regarding the different pathways gender (in)equality and maternal education affect breastfeeding. © 2016 John Wiley & Sons Ltd

Keywords: exclusive breastfeeding, gender (in)equality, maternal education, migrants, natives, Belgium.

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Introduction

There are distinct ethnic disparities in breastfeeding rates worldwide. Even though previous research has attempted to highlight underlying mechanisms (Gibson-Davis & Brooks-Gunn 2006; Sussner *et al.* 2008), much of these causal determinants remain unclear. A critical limitation is the focus on linear associations between socio-demographic determinants and exclusive breastfeeding (EBF) (Hector *et al.* 2004), only examined at the individual level. Even though the importance of contextual influences is recognized, such as the relevance of different types of social support (Renfrew *et al.* 2012) or

media scrutiny and sexualization in the public vs. private breastfeeding debate (Bentley *et al.* 2003; Acker 2009), they remain situated at the micro or meso level in society. Omitted from the bulk of research are the macro contextual influences that mothers experience in their decision-making process, especially regarding gender (in)equality. Thus, the aim of this current study resonates within the recognized importance of the macro-level social context in determining infant feeding decisions (Hector *et al.* 2005), and the appropriate multi-level techniques that should be used in these studies.

Previous studies have shown that the country of origin remains influential in determining feeding

choices through the migrants adherence to their cultural identity (Vanderlinden *et al.* 2015), where structural aspects of the host country are not always able to grasp this variation in EBF. It becomes clear that different population groups develop particular breastfeeding cultures. In this sense, migrants' cultural identity could be formed through the gender (in)equality in the country of origin. Feminist writers have long linked aspects of EBF to gender equality. Breastfeeding is argued to be highly dependent upon women's general status in society and can have positive as well as negative influences (Van Esterik 1994; Galtry 2000) through either the positive evaluation or devaluation of the social status attached to a primary caregiver, respectively (Ridgeway & Correll 2004). Gender equality refers to the extent to which males and females are considered each other social equals, in terms of social class, education, ethnicity and age (Chafetz 1989). Connell (1987) extends on this definition by emphasizing that gender inequality is embedded in a multidimensional structure of relationships between women and men that operates at every level of the human experience and is directly related to a gender hierarchy leading to structural inequalities in society (Kimmel & Holler 2000). EBF is thus embedded within both the gendered organization of production (economic position) and reproduction (childbirth and parenting). This crystallization of gender (in)equality into concrete norms, values and cultural identity could influence migrants' and natives' infant feeding decisions and practices.

Unfortunately, to date there are no empirical studies examining the impact of gender equality on EBF, especially among developed countries. To unravel the association between EBF, gender equality and maternal education, we will focus on these migrants' and natives' respective origin countries and draw on arguments posited by previous writers. Comparing different migrant groups with the native population gives insight into

the EBF chances of a population that has different cultural origins of gender (in)equality. Therefore, differences in macro-level gender (in)equality might explain ethnic disparities in EBF rates. Additionally, the degree of gender equality is not uniform in a complex society (Van de Velde *et al.* 2013) but varies according to other individual level resources, such as education. Much attention has been given to maternal education as a breastfeeding predictor. Yet less attention is put on the linkages between maternal education and gender (in)equality with EBF, and the several ways in which maternal education could have a differential impact on feeding decisions.

In this study, we distinguish three specific research aims. First, we examine whether differences in EBF rates between migrants and natives can be attributed to differences in macro-level gender (in)equality between maternal origin countries. Second, we examine whether higher maternal education has a positive association with EBF, as is posited by former research (Quarles *et al.* 1994; Bertini *et al.* 2003). Third, to what extent is this maternal education association with EBF universal across migrants and natives or, alternatively, does this association vary according to maternal origin country. Our focus is on Belgium (Flanders).

Macro-level gender (in)equality as an exclusive breastfeeding predictor

Breastfeeding is both biological and social in effect (Smith *et al.* 2012). The social consequences that accompany the decision to breastfeed cannot always be borne by all women in society (Hausman 2003). Social costs can include but are not limited to, unequal division between paid and unpaid labour possibly resulting in loss of income because of non-existent or insufficient policy measures (Galtry 2000), over-

Key messages

- Even in developed countries maternal education remains a highly important factor in determining EBF.
- The positive association of maternal education to EBF varies in strength over the entire native and migrant population.
- In fact, for mothers originating from developing countries with low gender equality scores this positive association of maternal education to EBF is completely nullified.

sexualization of the mother's breasts (Galupo & Ayers 2002), social stigmatization (Kendall-Tackett & Sugarman 1995; Hausman 2007), but also unattended physical difficulties (DiGirolamo *et al.* 2005) leading to early cessation. In his theory, Connell (1987) explains how societies' social structures are gendered. The unequal and sex-based allocation of opportunities, resources and access is often detrimental for women's political, economic and social status. The social consequences women bear are therefore not inherent to the gender specificity of breastfeeding but are rather a direct result of social norms and values, policy measures and cultural practices that sustain gender-based inequalities in reproductive health (Smith 2013). When policy negates the female body, the distribution of gender inequities may be transformed in favour of women who choose not to become mothers or decide not to breastfeed, leading to greater inequity among mothers who cannot afford to breastfeed and in effect have no or less control over their (work)time, (work)space and bodies (Smith 2013).

Galtry (2000) accurately pointed out that minimizing social costs of breastfeeding coincides with certain strategies to minimize gender inequality. When gender equality is acquired through a positive evaluation of the social status and identity as a primary caregiver, the social costs women bear when breastfeeding can thus be minimized. Even though the alleviation of these social costs is accomplished through structural policy measures (e.g. adequate parental leave policies), they can crystalize into culturalized norms and values, as can now be seen with Scandinavian countries' perspective on motherhood (Leira 1992; Borchorst & Siim 2008). The cultural identity migrants adhere to, which is strongly influenced by their country of origin (Berry 2006), can reflect these norms of gender equality. In this way, the social costs of EBF might be attenuated for women originating from more gender equal countries.

Migrants relocating to a host country nonetheless also experience a variety of acculturation processes. There is some American-based evidence that the chance of breastfeeding tends to decline over time in contact with the host country (Singh *et al.* 2007; Sussner *et al.* 2008). However, the decision to breastfeed is affected by personal, social, cultural and

geographical factors (Macadam & Dettwyler 1995; Bailey & Pain 2001). Vanderlinden *et al.* (2015) have shown that feeding choices remain influenced by the culture of the country of origin, even after migration. Breastfeeding is associated with motherhood and parenting cognitions and these cognitions are believed to be adopted from one's country of origin (i.e. for migrant mothers, their country from which they immigrated) (Bornstein & Cote 2004). In this sense, Foss (1996) suggests an adaption on Belsky's conceptual framework for parenting of infants and young children to determinants of parenting in immigrant populations. The model suggests that infant-related health outcomes, such as EBF rates, are the result of this transition to parenthood with culturally determined maternal parenting behaviour and with a primary focus on the contextual determinants of parenting (Foss 1996). A different research vein (scholastic achievement among migrants) has shown that there are strong structural origin effects that affect migrants in destination countries (Levels *et al.* 2008). Albeit this was in a different setting, it shows origin effects persist among migrant populations and is quite common to incorporate in a research design (Van der Bracht *et al.* 2014).

As mentioned earlier, gender equality can be seen as part of a mothers cultural identity. The main goal of gender equality is accomplishing a transformation of cultural attitudes towards equality with the corresponding social consequences for women (Inglehart & Norris 2003). Societal development and change underpin this attitudinal change (Inglehart & Norris 2003). Here, the question is whether macro-level gender (in)equality is a decisive factor in infant feeding decisions for migrants and natives. Given the differences in social status adhered to mothering and the different cultural conceptions attached to motherhood between population groups, we hypothesize the following: *mothers originating from countries with a high score on gender equality have more chance of exclusively breastfeeding their child than mothers originating from countries with an average score on gender equality, and similarly, mothers originating from countries with a low score on gender equality will have less chance of exclusively breastfeeding their child, than mothers originating from countries with an average score on gender equality (H1).*

Maternal education as an individual pathway to exclusive breastfeeding

Nevertheless, the degree of gender (in)equality is not uniform in a society and is moderated through individual resources (Van de Velde *et al.* 2013). Women's access to education has long been recognized as a fundamental right and a central policy aim of many international communities and countries (Kabeer 2005). In this study, education is especially relevant: empirical research has shown its well-established role in infant feeding decisions (Hörnell *et al.* 1999; Bertini *et al.* 2003; Colodro-Conde *et al.* 2011; Raffle *et al.* 2011); it is considered as a more fixed indicator of the mothers socio-economic status (Kwok & Yankaskas 2001; Heck *et al.* 2006), and there is a demonstrated close link between education and gender equality (Malhotra *et al.* 2003). This connection is most visible on issues of maternal health (Malhotra *et al.* 2003), where education is positively associated with higher use of maternal care services and improved health outcomes.

In developed countries, many studies have demonstrated a strong positive association between higher maternal education and longer duration of (exclusive) breastfeeding (Hörnell *et al.* 1999; Bertini *et al.* 2003; Colodro-Conde *et al.* 2011). Mothers with a higher education are generally better informed and understand the health benefits related to breastfeeding better (Raffle *et al.* 2011). They are eager to seek (more) information, support and help (Raffle *et al.* 2011). Moreover, mothers with a higher education tend to have more flexible work-related positions. The construction of motherhood behaviour is also different over different levels of maternal education (Cowdery & Knudson-Martin 2005). Mothers with a higher education display postgender behaviour, while mothers with a lower education adhere to very traditional gender role patterns. Likewise, education as an individual resource can allow mothers to alleviate the social costs and consequences accompanying the decision to exclusively breastfeed.

What is relatively unknown is whether this association varies across different population groups. In other words, are there additional benefits of education for some migrant groups compared with others or the native population, because in developing countries, a different association is often found. Previous research

posited an almost universal tendency for less educated mothers to breastfeed longer and to postpone supplementation (Cleland & Van Ginneken 1988). However, other work suggests that having a higher secondary education is beginning to be positively associated with breastfeeding rates (Aidam *et al.* 2005). Recently, Katepa-Bwalya *et al.* (2015) confirmed that maternal education improves breastfeeding rates in Zambia, giving more credit, again, to the universal positive tendency of education which is found in developed countries. Yet, this association is only confirmed among some developing countries. These recent developments highlight differences in trajectories for high, middle and low income countries regarding the connection between EBF and maternal education. In these settings, the broader social context is especially important: a range of underlying social and economic conditions need to be favourable in order for female education to have a beneficial impact on life domains (Malhotra *et al.* 2003). Malhotra and colleagues' review (2003) found female education to be more beneficial for women's choices in settings, that are already less patriarchal. When more highly educated mothers tend to work away from home and no compensatory (policy) measures for working mothers exist, a lowered breastfeeding prevalence rate is still expected (Davies-Adetugbo & Ojofeitimi 1996).

The assumed association between maternal education and EBF might thus be different across maternal origin countries in Belgium. Findings from previous studies lead us to hypothesize that *higher maternal education will be an important positive predictor for exclusive breastfeeding chances in Belgium (H2), but this positive maternal education effect will differ over origin countries (H3).*

Methods

Data collection and participants

The IKAROS data used in this study were provided by Kind en Gezin (Child and Family), a Flemish (i.e. the northern part of Belgium) public institution, which focuses on actively contributing to the welfare of young children and their families. This dataset is the most comprehensive source of information concerning the

development and evolution of young children in Flanders (Belgium) (Eggermont 2009). Kind en Gezin professionals systematically collect biometric, developmental and health-related information measured from birth until the age of 2.5 years and beyond. Socio-demographic and socio-economic information of the newborns parents was also collected (Eggermont 2009). The current analyses are based on an anonymized and randomly drawn sample of 55% ($N=34\,314$) representative of the total population of babies born in Belgium (Flanders) in 2004. When EBF percentages are compared between population data information and sample results, comparable percentages are acquired, further validating the comparability of our design.

In the present study, only mothers of whom we have the necessary information to conduct the analyses with, both on an individual and contextual level, are included. Six thousand three hundred seventy-five cases (18.58%) were dropped because of missing values on either maternal education or Global Gender Gap indicators for the year 2006. Educational level was undetermined for 4719 mothers, while no Global Gender Gap scores were available for 1934 mothers' origin countries. An analyze pattern procedure validates the casewise deletion of missing values because only 2.31% of our total amount of values for our analyses is missing. The final sample includes 27 936 mothers.

Dependent variable

Feeding method is a dichotomous variable, measured as 'exclusive breastfeeding' (1) vs. 'non-exclusive breastfeeding' (0) 3 months after childbirth, signifying if the mother has given her child only breast milk from birth until the checkup in week 12 after birth. EBF is defined as the consumption of the mother's milk without additives like water, juice or artificial milk, although supplementing breastfeeding with prescribed medication and vitamins is allowed (Alliet *et al.* 2012). This corresponds with the World Health Organizations definition of exclusive breastfeeding (The World Health Organization's 2014). The health care professionals at Kind en Gezin are aware of this definition and are trained to use it correctly (Adams & Dedry 2006). Data on EBF are routinely collected by health professionals at Kind en Gezin. Only one case is excluded from the

analyses because of drop out between the period of childbirth and the checkup 3 months after childbirth. Therefore, a possible problem of attrition or drop out in our sample is to be ignored.

Contextual variable

Gender (in)equality is an ordinal categorical variable based on Global Gender Gap (GGG) scores from the mother's country or origin. The mother's nationality at the time of her birth is used as a proxy for her country of origin. The highest possible GGG score that can be achieved by a country is 1, indicating total gender equality, while the lowest possible GGG score is 0, indicating total gender inequality. We distinguish three categories of gender (in)equality: origin countries with low scores on gender equality (<0.69) (1 = low GGG scores), origin countries with average scores on gender equality ($0.69-0.74$) (2 = average GGG scores), origin countries with high scores on gender equality (>0.74) (3 = high GGG scores). Categorization is centered around Belgium as a country scoring average on the GGG scale (2), compared with the other GGG scores of the migrants origin countries. The categories distinguished here mainly correspond with the following geographical division of origin countries, although there are exceptions in each case: countries with a low GGG score are mostly non-European and Eastern European countries (exceptions: United States, Australia, Canada...); countries with an average GGG score are mostly Western (Belgium) and Southern European countries, and countries with a high GGG score are mostly Northern European countries (exception: Germany). An extensive overview of these origin countries is provided in the appendix, along with a geographical decomposition.

Global Gender Gap scores were introduced by the World Economic Forum in 2006 and quantify the magnitude and scope of gender-based disparities worldwide (Bekhouch *et al.* 2013). GGG scores examine gender gaps in countries across four areas: economic participation and opportunity, educational attainment, health and survival and political empowerment. Also, its focus on gender gaps regarding access to resources instead of the country's level of resources, on outcomes instead of input and on measurements of gender equality instead

of women's empowerment (Bekhouch *et al.* 2013), makes this measure appropriate to use in research on breastfeeding.

Independent variable

Maternal educational level is a metric variable indicating the educational level attained by the mother. Firstly, data on the maternal educational level are routinely collected by Kind en Gezin through maternal self-report. We recoded these open answers into four categories, i.e., 'no or lower education' (1), 'lower secondary education' (2), 'higher secondary education' (3) and 'higher education' (4), a categorization which mainly corresponds to the International Standard Classification of education (ISCED 2011) by the United Nations Educational, Scientific and Cultural Organization. These ordinal categories were tested over several models and were shown to behave very linearly. Subsequently, the maternal education level was included as a metric variable in the analyses.

Control variables

We control for *baby's parity*, *baby's birth weight and length*, *baby's sex*, *maternal age* and *the mother's migrant status*. *Baby's parity* has provided mixed results in previous studies, with some results indicating increased or decreased breastfeeding rates and other finding no association whatsoever (Hill *et al.* 1997; Hill & Johnson 2007). Parity of the child is a metric variable indicating the number of births the mother has gone through. *Baby's birth weight and length* are related to healthy infant growth and development, where slower growth and development can be a barrier to breastfeeding (Ahluwalia *et al.* 2005). The baby's birth weight is a metric variable, which represents weight in kilogram. The baby's birth length is also a metric variable representing length in centimetres. In previous research, *baby's sex* showed no association with breastfeeding rates (Fenglian *et al.* 2007; Nakao *et al.* 2008; Örün *et al.* 2010). However, it remains an important socio-demographic variable to include in infant feeding research. The baby's sex is a dichotomous variable with categories 'girl' (0) and 'boy' (1). *Maternal age* has been systematically proven as an important precursor to breastfeeding intention and

duration, with older women initiating breastfeeding more and also breastfeeding longer (Scott & Binns 1999; James & Lessen 2009). *Maternal age* is a metric variable in full years. Finally, *the mother's migrant status* is included, because ethnicity and acculturation have been proven to impact breastfeeding rates (Celi *et al.* 2005; Gibson-Davis 2006; Singh *et al.* 2007; Sussner *et al.* 2008). Naturalization is used as a measure for acculturation, and naturalized migrants are expected to behave similarly to ethnic Belgians. Thus, *the mother's migrant status* is a categorical variable with categories 'naturalized migrant mothers' (0), 'Belgian mothers' (1) and 'migrant mothers' (2).

Analyses

Given the structure of the data, where individuals are nested according to their origin country, and of the dependent variable, with feeding method being a dichotomous variable, we need to use a binary logistic multilevel technique to analyze this data. For our analyses, we discern two levels where mothers are nested according to maternal origin countries, based on the nationality at the mother's birth, leading to 27 936 level-1 units (mothers) nested in 86 level-2 units (origin countries). To test our hypothesized associations with feeding method, we construct random intercept and random intercept combined with random slope logistic multilevel models. In a random intercept model, the intercept is allowed to vary, meaning that the estimated coefficients are predicted by allowing the intercept to vary across the different level-2 units (i.e. 86 origin countries). In a random intercept and slope model, both the intercept and slope are allowed to vary across each level-2 unit (i.e. 86 origin countries).

Figure 1 highlights our analytical and conceptual strategy: to test Hypothesis 1, we include the contextual effect of macro-level gender (in)equality into the model (Fig. 1 H1); to test Hypothesis 2, a random intercept model is constructed for maternal education (Fig. 1 H2). Finally, to test Hypothesis 3, we create a random intercept combined with a random slope model for maternal education to test whether the effect of maternal education is different over these maternal origin countries (Fig. 1 H3). This results in the presentation of five different models: the null model (1), the model

Fig. 1 Analytical and conceptual strategy for estimated log odds ratios of macro-level gender equality and maternal education on exclusive breastfeeding (EBF).

with controls (2), the model with macro-level gender (in)equality only (3), the model that adds maternal education (4) and the model with a random slope for maternal education (5).

Results

Table 1 reports the descriptive statistics. More than one in four babies born in Belgium (Flanders) in 2004 was exclusively breastfed for 3 months after birth. There are slightly more boys than girls, and the average maternal age is 30. The average birthweight is 3.32 kg, and the average length slightly less than 50 cm. The vast majority of mothers are ethnic Belgians (84.9%). About 5% of migrants were naturalized since their stay in Belgium and now carry the Belgian nationality. The remaining 10.2% are mothers of migrant origin who still have a foreign nationality. Most mothers have attained a quite high level of education.

Table 2 shows the results of the analyses and variance components of the different multilevel models. First, from the null model, we see that about 3.6% of the variation in individual feeding choices is determined by differences between the migrant mother's country of origin. In Model 2, we notice that a higher birthweight and length, being a girl and a higher maternal age signify higher EBF chances. These controls appear to be very consistent over different models. The effect of parity however changes in direction over the subsequent models. In Model 4, already having children increases the chance of EBF, whereas in the previous models, it indicates a decreased chance. Through bivariate analyses, we found that parity and maternal education are negatively correlated with each other, which explains the direction shift. The absolute changes are very small, and the odds ratio (OR) remains close to 1, indicating parity does not affect EBF as strongly as other indicators. Finally, migrant status needs to be addressed. We can see that migrants have a much higher chance of breastfeeding their newborn than naturalized migrants do. Belgians and naturalized migrants share a similarity in feeding choice.

To test our first hypothesis, which stated that mothers originating from countries scoring higher on gender equality have more chance of exclusively breastfeeding

Table 1. Descriptive characteristics of newborn in Belgium (Flanders) in 2004, according to exclusive breastfeeding prevalence ($N = 27\,936$)^a

		Exclusive breastfeeding		Total	$P < 0.01$
		Yes (27%, 7542)	No (73%, 20 394)		
Mean (S.D.)	Parity	1.80 (0.96)	1.75 (0.98)	1.76 (0.98)	***
	Birth weight (in kg)	3.40 (0.48)	3.29 (0.54)	3.32 (0.53)	***
	Birth length (in cm)	50.22 (2.25)	49.71 (2.58)	49.85 (2.50)	***
	Maternal age (in year)	30.36 (4.35)	29.63 (4.70)	29.82 (4.62)	***
	Maternal education	3.55 (0.73)	3.35 (0.72)	3.40 (0.73)	***
Percentages	Baby's sex				***
	Boy	49.7	52.4	51.70	
	Girl	50.3	47.6	48.30	
	Gender equality: origin country				***
	Low	13.4	10.4	11.2	
	Average	85.7	89.1	88.2	
	High	0.9	0.5	0.6	
	Migrant status				***
	Migrant	13.5	9.0	10.20	
	Naturalized migrant	5.0	4.8	4.90	
	Belgian	81.5	86.2	84.90	
	Region of origin				***
	Belgium	86.5	91.0	89.80	
	Northern Europe	0.3	0.1	0.1	
	Southern Europe	1.0	0.8	0.9	
	Western Europe	3.3	2.3	2.6	
	Eastern Europe	2.2	1.0	1.4	
	Turkey and Morocco ^b	4.2	3.2	3.5	
	Outside Europe	2.4	1.5	1.8	

S.D., standard deviation. ^aSource: IKAROS – own calculations. ^bTurkish and Moroccan migrant groups are separated from others because they form the two largest migrant groups in Belgium and have shown homogeneity in feeding choice. Pearson χ^2 shows these two groups are statistically non-significant from each other (Pearson $\chi^2 = 3.381$, $P < 0.066$).

their baby compared with mothers originating from countries scoring lower on gender equality, we look at Model 3. We see a non-significant contextual association between gender (in)equality and EBF. Neither lower GGG country scores nor higher GGG country scores compared with average GGG country scores affect EBF, which is contrary to expectations and therefore leads us to reject our first hypothesis, initially.

Our second hypothesis posits that a higher maternal education is positively associated with EBF. Our results, in Model 4, confirm this hypothesis. Mothers with a higher education are almost twice as likely to exclusively breastfeed their newborn than mothers with a lower education (OR: 1.744, $P < 0.001$). Interestingly, gender (in)equality becomes significant when maternal education is added to our model, indicating a composition effect of gender (in)equality. Here, migrant mothers originating from countries with a lower score

on gender equality are more likely to exclusively breastfeed their child (OR: 1.478, $P < 0.05$) compared with mothers from countries scoring average on gender equality, but only if we control for maternal education. This would signify processes of gender (in)equality do impact EBF rates but are molded into individual level resources, such as maternal education. Our subsequent models dig further into this.

The third hypothesis questioned whether the effect of maternal education is universal for each population group or if the strength of its effects varies over the native and migrant population. Turning to our random slope model (Model 5), we can see that the effect of education varies over subsequent countries of origin. An associated t -test showed this random slope to be significant in our model. The main effect of maternal education remains positive, but the covariance between intercept and slope is negative. This indicates that the

Table 2. Results from binary logistic multi-level analyses for exclusive breastfeeding in Belgium (Flanders) in 2004 (N = 27,936)^{a,b}

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Intercept	0.558***	[0.487-0.640]										
Parity			0.006***	[0.002-0.013]	0.005***	[0.0-0.028]	0.009***	[0.001-0.061]	0.009***	[0.001-0.052]	0.003***	[0.0-0.009]
Birth weight (kilo)			0.965 ^a	[0.938-0.994]	0.965*	[0.938-0.994]	1.058***	[1.025-1.091]	1.056***	[1.024-1.09]	1.055***	[1.023-1.089]
Birth length (cm)			1.266***	[1.162-1.38]	1.266***	[1.162-1.380]	1.218***	[1.119-1.335]	1.203***	[1.102-1.314]	1.204***	[1.101-1.318]
Boy			1.054***	[1.033-1.074]	1.054***	[1.033-1.074]	1.046***	[1.025-1.066]	1.043***	[1.023-1.064]	1.044***	[1.024-1.065]
Maternal age (years)			0.835***	[0.79-0.882]	0.835***	[0.79-0.882]	0.842***	[0.796-0.889]	0.848***	[0.803-0.896]	0.847***	[0.8-0.897]
Migrant status			1.037***	[1.03-1.043]	1.037***	[1.031-1.043]	1.016***	[1.01-1.022]	1.013***	[1.007-1.019]	1.013**	[1.005-1.021]
Belgian			0.791	[0.42-1.489]	0.783	[0.412-1.489]	0.811	[0.368-1.786]	0.687	[0.355-1.329]	0.694	[0.328-1.471]
Migrant			1.391***	[1.194-1.621]	1.388***	[1.191-1.617]	1.751***	[1.489-2.062]	1.423***	[1.212-1.671]	1.413***	[1.206-1.657]
Naturalized migrant												
Maternal education							1.744***	[1.664-1.828]	1.246	[1.095-1.418]	1.644***	[1.304-2.072]
Gender equality: origin country												
Low					1.201	[0.879-0.164]	1.478*	[1.045-2.091]	1.307	[0.95-1.8]	4.267***	[1.672-10.89]
Average												
High					1.468	[0.88-2.449]	1.42	[0.806-2.503]	1.53	[0.903-2.59]	2.081	[0.279-15.518]
Maternal education*												
Gender equality: Low											0.689***	[0.524-0.904]
Gender equality: Average												
Gender equality: High											0.904	[0.517-1.58]
Variance												
Individual	3.29		3.29		3.29		3.29		3.29		3.29	
Education												
Contextual	0.123	0.048	0.095	0.041	0.096	0.041	0.148	0.056	0.062	0.035	0.042	0.027
Covariance									0.809	0.407	0.471	0.288
									-0.21	0.116	-0.121	0.084

CI, confidence interval; OR, odds ratio. ^aSource: IKAROS – own calculations ^bThe significant values of the following probabilities. ***p < 0.001; **p < 0.01; *p < 0.05.

maternal education benefits are greater for some origin countries than others when determining EBF chances or, in other words, that the random slopes show a positive fanning in pattern. When examining these random slope effects in detail, we find negative maternal education effects for two origin countries, Uganda and Bulgaria, but very strong additional maternal education effects for following origin countries: Belgium, Canada, The Netherlands, Italy and Portugal, respectively. Next, we tested whether these countries differed significantly from the intercept. This was only the case for Uganda, with a negative association, and for Belgium and The Netherlands, with a positive association.

Because a significant random slope and composition effect was found for maternal education, we extend on our research design to incorporate a final model, which examines a cross-level interaction effect between gender (in)equality and maternal education (i.e. what could explain the different effect of maternal education over subsequent origin countries). Markov Chain Monte Carlo estimations were used to calculate Model 6. A negative cross-level interaction is found between low gender equality and education, indicating mothers originating from gender unequal countries with a higher level of education have less chance at EBF. Furthermore, we notice that the chance to exclusively breastfeed your child is more than four times higher when originating from countries with a low score on gender equality than an average score on gender equality, but only when these mothers have a lower education (OR 4.267, $p < 0.01$). Conversely, the main effect for maternal education is now only valid for mothers originating from countries scoring averagely on gender equality (OR: 1.647). These results clearly show how gender (in)equality operates in unison with maternal education to determine EBF rates.

Discussion

In recent years, ethnic differences in breastfeeding rates have been studied abundantly. Likewise, the impact of gender (in)equality on feeding methods has received an increasing amount of attention in the research literature (Van Esterik 1994; Huber 2007; McCarter-Spaulding 2008; Rippeyoung & Noonan

2012; Smith *et al.* 2012; Smith 2013). Some authors stated that breastfeeding contributes to gender equality and the empowerment of women (Huber 2007) and that to ensure prolonged breastfeeding, it is vital to improve women's status and position in society (Smith 2013), while others warned for the detrimental effect improving gender equality would have on breastfeeding if the gendered organization of reproduction was not also consolidated in policy. Gender (in)equality might be uniquely qualified to help explain ethnic disparities in breastfeeding rates. In order to examine our first research aim, using the IKAROS dataset, we were able to consider the effect of gender (in)equality on EBF. To our knowledge, this is the first study that empirically questions whether gender (in)equality molds lifestyle choices concerning the feeding method of newborns. Our findings indicate, however, that gender (in)equality in the country of origin is not directly associated with feeding choices among natives and migrants in Belgium but is affected by maternal education in determining EBF chances. There are several explanations for our results of gender (in)equality.

To explain the absence of a direct effect, we first suggest the possibility of gender (in)equality's moderation through time and regime types. This refers to a type of cultural lag effect, where gender equality (policy) measures take time to fully develop into culturalized feeding choices. Changes in women's roles, access to resources and information, labour market positions and alternative infant feeding choices have changed dramatically over these past decades (Dobash & Dobash 1992; Hausman 2003; Lee 2008; Van de Velde *et al.* 2014), and not every aspect of their lives has been able to catch up. There is a distinct possibility that these innovations and policy measures are not yet incorporated into women's infant feeding culture, even if, at a broader structural level, gender equality is realized. Gender equality goes beyond legislation and social policies, because the position and evaluation of men and women in society is greatly determined by the cultural norms and tradition of their home country (Nagy 2006). Likewise, gender (in)equality could be incorporated through welfare state regimes. There is a strong connection between welfare state regimes and gender (in)equality, i.e., the symmetry of gender relations, because of the amount of (de)familization and the

organization and structure of the labour market and health care facilities (Van de Velde *et al.* 2014), but moreover the way regimes deal with the gendered organization of production as well as reproduction. Some welfare state regimes fully support women's labour even when they decide to have children and/or breastfeed, by reducing the (social) costs often accompanied by breastfeeding (e.g. Nordic regime) (Van de Velde *et al.* 2014). This in turn benefits the social and economic position of women in society. There is a distinct possibility that welfare state regimes mediate the effect gender (in)equality has on (exclusive) breastfeeding. Further research should focus on incorporating welfare state regimes and gender-specific policies, focusing on the gendered organization of reproduction, such as paid maternity and breastfeeding leave or rights to daily nursing breaks.

Another possibility is related to the multilevel structure of our data, where gender (in)equality does not directly affect infant feeding decisions but is moderated by its association with maternal education. As stated, the degree of gender equality is not uniform in a complex developed society (Van de Velde *et al.* 2013), but varies according to other individual level resources, such as maternal education. Our additional analyses definitely propose this. The way gender (in)equality impacts feeding choices is influenced by maternal education throughout different origin countries. If educational level was to be evenly distributed among origin countries, we would find a strong main gender (in)equality effect, which is not contradictory to literature. Malhotra *et al.* (2003) found a close link between maternal education and gender (in)equality, where underlying conditions need to be favourable in order for education to have a positive effect on gender equality and maternal well-being. This corresponds with our findings, where mothers from countries scoring averagely on gender equality are only positively associated with EBF through their higher maternal education, highlighting different trajectories for low, average and high scoring countries on the connection between gender (in)equality and maternal education.

The other research aims focus on the universality of the association between maternal education EBF, something that has received much attention in previous studies (Colodro-Conde *et al.* 2011), leading it to be

incorporated as a control variable in a wide array of other studies. There is a universal assumption that a higher maternal education leads to higher breastfeeding rates in developed nations (Hörnell *et al.* 1999; Bertini *et al.* 2003; Colodro-Conde *et al.* 2011). Our design allowed us to test whether this association is positive across all population groups in Belgium, which was our second research aim, or if the educational benefits are stronger for some groups compared to others, which was our third research aim. Our results clearly provide strong evidence for both. This is not necessarily contradictory to existing literature for two specific reasons. Previous literature already suggested that maternal education operated differently in low, middle and high income countries (Malhotra *et al.* 2003; Colodro-Conde *et al.* 2011). Also, feeding choices are known to be influenced by personal, social, cultural as well as geographical factors (Macadam & Dettwyler 1995; Bailey & Pain 2001). The connection between these two findings provides part of the explanation for our results: with different migrant groups being influenced by their country of origin and cultural heritage.

However, we discovered that the effect of maternal education is also different according to the gender (in)equality levels of the countries of origin, where a higher education is even detrimental for EBF chances, but only for mothers originating from low gender equality origin countries. This is contradictory to more recent studies of the maternal education effects on (E)BF in developing countries (Aidam *et al.* 2005; Katepa-Bwalya *et al.* 2015). This can be explained through the focus these recent studies put on only distinguishing lower secondary education from higher secondary education and not taking higher education in general into account, something that is incorporated in our study. Also, these studies are from 2005 onwards, indicating a different generation of mothers is studied here than in our data sample, where our results regarding education seem to correspond with studies from developing countries conducted between 1970–2000 (Cleland & Van Ginneken 1988; Davies-Adetugbo & Ojofeitimi 1996). Finally, the findings seem to hint at a curvilinear association of gender (in)equality with breastfeeding practices with specific and different outcomes for low, average and high scoring countries on gender (in)

equality, but also for low, middle and high income countries. There are several important implications to be made, but once again it becomes clear that culturally adapted health services, access, care and advice are needed to ensure (exclusive) breastfeeding is supported throughout native and migrant groups (Río *et al.* 2011; Vanderlinden *et al.* 2015).

As always, this research is subject to some limitations. First, we use GGG scores as an indicator for the amount of gender (in)equality present in the country of origin. There are no gender scores available prior to 2006, which means we used the situation in 2006 as a reflection of the gender equality situation in 2004. In other words, there is a 2-year period between the data measurements (2004) and the gender (in)equality measurements (2006). Although gender (in)equality is not a static concept, we argue that this 2-year difference is not insuperable and is in fact a close reflection of the situation in 2004. Additional analyses of GGG measures between 2006 and 2008 confirm this. The mean difference between both periods is 0.013, which is small enough to warrant our decision. Furthermore, one might not consider the gender (in)equality situation in 2006 indicative for the gender (in)equality situation the time the mother was socialized in the country of origin. The evolution of several GGG sub-indicators was examined in order to determine the validity of our research design: average mean change in female to male labour force participation, average mean change in female to male primary enrolment, average mean change in sex ratio and average mean change of women in parliament from 1990 to 2013. Each of these sub-indicators is a part of the construction of the GGG measure from 2006 onwards. The largest differences were found among the areas of economic participation and opportunity, and political empowerment respectively. To evaluate the magnitude of these differences, we calculated the mean difference per country for the female to male labour force participation. The average change over all countries is 3.74%, which would indicate that the changes over this large period of time have been largely uniform between countries.

Second, the GGG scores were also derived from the mothers nationality at the time of her birth, which was used to derive her country of origin. This means it is difficult to make significant distinctions between first and

second generation migrants. Doing this would have allowed us to make a more precise prediction of the effect of gender equality on breastfeeding, because the first generation migrant shows a stronger cultural connection to their home country (Gibson-Davis & Brooks-Gunn 2006; Sussner *et al.* 2008). Our dataset however provides no means to distinguish migrants' generational status or length of stay. We do include another acculturation or integration measure in our analyses, i.e. naturalization of migrants or migrant status. Although this can be considered only as a crude acculturation measure, we believe this partially attenuates possible acculturation differences. Research does provide evidence for this assumption, where individual assimilation is considered an important predictor for naturalization (Diehl & Blohm 2003). Our study provides further evidence for the effects of naturalization on breastfeeding rates, but the association between EBF and maternal education remains strong even though we control for this. Moreover, we can make significant parallels between generational status and migrant status since reports would suggest a large proportion of the migrants distinguished in our data would be first generation migrants (Tielens 2005; Lodewijckx 2010), further validating our design.

Based on the results of our final models, which are valid only for the proportion of mothers selected by Kind en Gezin, we can conclude the following. We suggest there are three different distinctive pathways that lead to high (exclusive) breastfeeding rates. Firstly, maternal educational level clearly is an important factor for infant feeding decisions in developed countries. Even though maternal educational level is considered to have a stable impact in more industrialized countries such as Belgium, our results prove otherwise. Having a higher education allows mothers to be more pro-active information-wise and more flexible work-wise. This contributes to the international literature regarding the importance of education and information (Bertini *et al.* 2003; McFadden & Toole 2006). However, these effects of maternal education are mediated by cultural origin, which is embedded in different mechanisms of gender (in)equality. This leads us to two other pathways. A second pathway is rooted in more traditional mechanisms and values, which is evident in our results on the ethnic disparities in EBF among low scoring

gender equality origin countries. In these countries, it seems that mothers are expected to breastfeed through cultural tradition. The positive impact of maternal education is nullified, but only for these low scoring gender equality origin countries. We can also distinguish a third pathway for countries scoring averagely or higher on gender equality. For these origin countries, gender (in)equality might operate at a micro level in shaping infant feeding decisions (e.g. the way couples negotiate daily tasks and demands for childcare, how work-family conflicts are mediated...), instead of being reflected in structural and macro-level influences. Further research should dig into these suggested pathways in order to gauge the complete impact of gender (in)equality and maternal education on infant feeding decisions. In sum, the effects of gender (in)equality and EBF are not linear, nor as straightforward as initially assumed, but operate differently through individual resources and across population groups.

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Conflict of interest

The authors declare that they have no conflicts of interest.

Contributions

KV was responsible for the study design, data preparation and analysis, report writing and critical amendments. BVDP was responsible for critical amendments to the report writing and study design.

References

Acker M. (2009) Breast is best... but not everywhere: ambivalent sexism and attitudes toward private and public breastfeeding. *Sex Roles* **61** (7-8), 476.

- Adams J. & Dedry A. (2006) Kennis van Gezondheidswerkers Rond Borstvoeding. Wat ze Vandaag (al?) Weten en Morgen (nog?) Moeten Leren, om Overmorgen Voedende Moeders Succesvol te Begeleiden (Knowledge of Health Care Professionals Regarding Breastfeeding: What They Know now and Have to Learn Tomorrow to Successfully Guide Lactating Mothers). De bakermat, Leuven, Belgium.
- Ahluwalia I.B., Morrow B. & Jason H. (2005) Why do women stop breastfeeding? Findings from the pregnancy risk assessment and monitoring system. *Pediatrics* **116** (6), 1408–1412.
- Aidam B.A., Pérez-Escamilla R., Lartey A. & Aidam J. (2005) Factors associated with exclusive breastfeeding in Accra, Ghana. *European Journal of Child Nutrition* **59** (6), 789–796.
- Alliet P., Arts W., De Greef E., Hauser B., Hoffman I., Mahler T. *et al.* (2012) *Richtlijnen Over Borstvoeding en Kunstvoeding Voor Zuigelingen van 0 tot 12 Maanden (Guidelines Regarding Breast- and Bottlefeeding for Newborns 0 to 12 Months)*. Werkgroep Voeding van de Vlaamse Kindergeneeskunde: Belgium.
- Bailey C. & Pain R. (2001) Geographies of infant feeding and access to primary health-care. *Health & Social Care in the Community* **9** (5), 309–317.
- Bekhouch Y., Hausmann R., Tyson L. & Zahidi S. (2013) The Global Gender gap Report 2013. World Economic Forum.
- Bentley M., Lee D. & Jensen J. (2003) Breastfeeding among low income, African-American women: power, beliefs and decision making. *The Journal of Nutrition* **133** (1), 305–309s.
- Berry J.W. (2006) Mutual attitudes among immigrants and ethnocultural groups in Canada. *International Journal of Intercultural Relations* **30** (6), 719.
- Bertini G., Perugi S., Dani C., Pezzati M., Tronchin M. & Rubaltelli F.F. (2003) Maternal education and the incidence and duration of breast feeding: a prospective study. *Journal of Pediatric Gastroenterology and Nutrition* **37** (4), 447–452.
- Borchorst A. & Siim B. (2008) Women-friendly policies and state feminism: theorizing Scandinavian gender equality. *Feminist Theory* **9** (2), 207.
- Bornstein M.H. & Cote L.R. (2004) Mothers' parenting cognitions in cultures of origin, acculturating cultures, and cultures of destination. *Child Development* **75** (1), 221–235.
- Celi A.C., Rich-Edwards J.W., Richardson M.K., Kleinman K. P. & Gillman M.W. (2005) Immigration, race/ethnicity, and social and economic factors as predictors of breastfeeding initiation. *Archives of Pediatrics & Adolescent Medicine* **159** (3), 255.
- Chafetz J.S. (1989) Gender equality: toward a theory of change. In: *Social Change: An Anthology. Feminism and Sociological Theory*, 135–160. General Hall Inc.
- Cleland J.G. & Van Ginneken J.K. (1988) Maternal education and child survival in developing countries: the search for pathways of influence. *Social Science & Medicine* **27** (12), 1357–1368.

- Colodro-Conde L., Sánchez-Romera J.F., Tornero-Gómez M. J., Pérez-Riquelme F., Polo-Tomás M. & Ordoñana J.R. (2011) Relationship between level of education and breastfeeding duration depends on social context: breastfeeding trends over a 40-year period in Spain. *Journal of Human Lactation* **27** (3), 272–278.
- Connell R.W. (1987) *Gender and Power: Society, the Person and Sexual Politics*. Polity Press: Cambridge.
- Cowdery R.S. & Knudson-Martin C. (2005) The construction of motherhood: tasks, relational connection, and gender equality. *Family Relations* **54** (3), 335–345.
- Davies-Adetugbo A.A. & Ojofeitimi E. (1996) Maternal education, breastfeeding behaviours and lactational amenorrhoea: studies among two ethnic communities in Ile Ife, Nigeria. *Nutrition and Health* **11** (2), 115–126.
- Diehl C. & Blohm M. (2003) Rights or identity? Naturalization processes among ‘labor migrants’ in Germany. *International Migration Review* **37** (1), 133–162.
- DiGirolamo A., Thompson N., Martorell R., Fein S. & Grummer-Strawn L. (2005) Intention or experience? Predictors of continued breastfeeding. *Health Education & Behavior* **32** (2), 208–226.
- Dobash R.E. & Dobash R.P. (1992) *Women, Violence, and Social Change*. Routledge: London.
- Eggermont R. (2009). Gemeentelijke Kindrapporten: Beschrijving van de Tabellen (Municipal Child Reports: Table Descriptions). Kind & Gezin.
- Fenglian X., Binns C., Zheng S., Wang Y., Zhao Y. & Lee A. (2007) Determinants of exclusive breastfeeding duration in Xinjiang, PR China. *Asia Pacific Journal of Clinical Nutrition* **16** (2), 316–321.
- Foss G.F. (1996) A conceptual model for studying parenting behaviors in immigrant populations. *Advances in Nursing Science* **19** (2), 74–87.
- Galtry J. (2000) Extending the ‘bright line’ feminism, breastfeeding, and the workplace in the United States. *Gender & Society* **14** (2), 295–317.
- Galupo M.P. & Ayers J.F. (2002) Negotiating the maternal and sexual breast: narratives of breastfeeding mothers. *Journal of the Motherhood Initiative for Research and Community Involvement* **4** (1), 20–30.
- Gibson-Davis C.M. & Brooks-Gunn J. (2006) Couples’ immigration status and ethnicity as determinants of breastfeeding. *American Journal of Public Health* **96** (4), 641.
- Hausman B.L. (2003) *Mother’s Milk: Breastfeeding Controversies in American Culture*. Routledge: New York.
- Hausman B.L. (2007) Things (not) to do with breasts in public: maternal embodiment and the biocultural politics of infant feeding. *New Literary History* **38** (3), 479–504.
- Heck K.E., Braveman P., Cubbin C., Chávez G.F. & Kiely J.L. (2006) Socioeconomic status and breastfeeding initiation among California mothers. *Public Health Reports* **121** (1), 51.
- Hector D., King L.A. & Webb K. (2004) Overview of Recent Reviews of Interventions to Promote and Support Breastfeeding: NSW Centre for Public Health Nutrition [and] NSW Department of Health.
- Hector D., King L., Webb K. & Heywood P. (2005) Factors affecting breastfeeding practices. Applying a conceptual framework. *New South Wales Public Health Bulletin* **16** (4), 52–55.
- Hill P.D. & Johnson T.S. (2007) Assessment of breastfeeding and infant growth. *Journal of Midwifery & Women’s Health* **52** (6), 571–578.
- Hill P., Humenick S.S., Argubright T.M. & Aldag J.C. (1997) Effects of parity and weaning practices on breastfeeding duration. *Public Health Nursing* **14** (4), 227–234.
- Hörnell A., Aarts C., Kylberg E., Hofvander Y. & Gebre-Medhin M. (1999) Breastfeeding patterns in exclusively breastfed infants: a longitudinal prospective study in Uppsala, Sweden. *Acta Paediatrica* **88** (2), 203–211.
- Huber J. (2007) *On the Origins of Gender Inequality*. Paradigm Publishers: Boulder.
- Inglehart R. & Norris P. (2003) *Rising Tide: Gender Equality and Cultural Change Around the World*. Cambridge University Press: Cambridge.
- International Standard Classification of Education: ISCED 2011. Unesco Institute for Statistics; 2012.
- James D.C. & Lessen R. (2009) Position of the American Dietetic Association: promoting and supporting breastfeeding. *Journal of the American Dietetic Association* **109** (11), 1926–1942.
- Kabeer N. (2005) Gender equality and women’s empowerment: a critical analysis of the third millennium development. *Gender and Development* **13** (1), 13.
- Katepa-Bwalya M., Mukonka V., Kankasa C., Masaninga F., Babaniyi O. & Siziya S. (2015) Infants and young children feeding practices and nutritional status in two districts of Zambia. *International Breastfeeding Journal* **10**, 5.
- Kendall-Tackett K.A. & Sugarman M. (1995) The social consequences of long-term breastfeeding. *Journal of Human Lactation* **11** (3), 179–183.
- Kimmel M.S. & Holler J.Z. (2000) *The Gendered Society*. Oxford University Press: Oxford.
- Kwok R.K. & Yankaskas B.C. (2001) The use of census data for determining race and education as SES indicators: a validation study. *Annals of Epidemiology* **11** (3), 171–177.
- Lee E.J. (2008) Living with risk in the age of ‘intensive motherhood’: maternal identity and infant feeding. *Health, Risk & Society* **10** (5), 467–477.
- Leira A. (1992) *Welfare States and Working Mothers: The Scandinavian Experience*. Cambridge University Press: Cambridge.
- Levels M., Dronkers J. & Kraaykamp G. (2008) Immigrant children’s educational achievement in western countries: origin, destination, and community effects on mathematical performance. *American Sociological Review* **73** (5), 835–853.
- Lodewijckx E. (2010) Gezinsvorming bij Tweede Generatie Turken en Marokkanen: Een Verschillende Start al Naargelang ze Huwen met een Huwelijksmigrant of met Iemand van de Tweede Generatie (Family Formation

- Among Second Generation Turkish and Moroccan Migrants). SVR-webartikel, Studiedienst van de Vlaamse Regering.
- Macadam P.S. & Dettwyler K.A. (1995) *Breastfeeding: Biocultural Perspectives*. Transaction Publishers: New York.
- Malhotra A., Pande R. & Grown C. (2003) Impact of Investments in Female Education on Gender Equality. International Center for Research on Women.
- McCarter-Spaulling D. (2008) Is breastfeeding fair? Tensions in feminist perspectives on breastfeeding and the family. *Journal of Human Lactation* **24** (2), 206–212.
- McFadden A. & Toole G. (2006) Exploring women's views of breastfeeding: a focus group study within an area with high levels of socio-economic deprivation. *Maternal & Child Nutrition* **2** (3), 156–168.
- Nagy I. (2006) Measuring the Global Gender Gap: An International Comparison. Changing role: report on the situation of the women and men in Hungary, TARKI Social Research Institute, Budapest, Hungary, 192–205.
- Nakao Y., Moji K., Honda S. & Oishi K. (2008) Initiation of breastfeeding within 120 minutes after birth is associated with breastfeeding at four months among Japanese women: A self-administered questionnaire survey. *International Breastfeeding Journal*. DOI: 10.1186/1746-4358-3-1.
- Örün E., Yalçın S., Madendag Y., Üstünyurt-Eras Z., Kutluk S. & Yurdakök K. (2010) Factors associated with breastfeeding initiation time in a baby-friendly hospital. *The Turkish Journal of Pediatrics* **52** (1), 10–16.
- Quarles A., Williams P.D., Hoyle D.A., Brimeyer M. & Williams A.R. (1994) Mothers' intention, age, education and the duration and management of breastfeeding. *Maternal-Child Nursing Journal* **22** (3), 102–108.
- Raffle H., Ware L., Borcharat A. & Strickland H. (2011) *Factors That Influence Breastfeeding Initiation and Persistence in Ohio's Appalachian Region*. Voinovich School of Leadership and Public Affairs at Ohio University: Athens.
- Renfrew M., McCormick F., Wade A., Quinn B. & Dowswell T. (2012) Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database of Systematic Reviews* **5** CD001141.
- Ridgeway C.L. & Correll S.J. (2004) Motherhood as a status characteristic. *Journal of Social Issues* **60** (4), 683–700.
- Río I., Castelló-Pastor A., Sandín-Vázquez M., Barona C., Jané M. & Más R. (2011) Breastfeeding initiation in immigrant and non-immigrant women in Spain. *European Journal of Clinical Nutrition* **65** (12), 1345.
- Rippeyoung P.L. & Noonan M.C. (2012) Is breastfeeding truly cost free? Income consequences of breastfeeding for women. *American Sociological Review* **77** (2), 244–267.
- Scott J.A. & Binns C.W. (1999) Factors associated with the initiation and duration of breastfeeding: a review of the literature. *Breastfeeding Review* **7** (1), 5–16.
- Singh G.K., Kogan M.D. & Lee D.L. (2007) Nativity/immigrant status, race/ethnicity, and socioeconomic determinants of breastfeeding initiation and duration in the United States, 2003. *Pediatrics* **119** (1), 538–546.
- Smith P.H. (2013) Breastfeeding and gender inequality. *Journal of Women, Politics & Policy* **34** (4), 371–383. DOI: 10.1080/1554477X.2013.835682.
- Smith P.H., Hausman B. & Labbok M. (2012) *Beyond Health, Beyond Choice: Breastfeeding Constraints and Realities*. Rutgers University Press: New Brunswick.
- Sussner K.M., Lindsay A.C. & Peterson K.E. (2008) The influence of acculturation on breast-feeding initiation and duration in low-income women in the US. *Journal of Biosocial Science* **40** (5), 673–696.
- The World Health Organization's. Infant Feeding Recommendation. WHO website. http://www.who.int/nutrition/topics/infantfeeding_recommendation/en/. Accessed May 21, 2014.
- Tielens M. (2005) Eens Allochtoon, Altijd Allochtoon? De Socio-Economische Etnostratificatie in Vlaanderen. (Once Foreigner, Always Foreigner?: The Socioeconomic Ethnostratification in Flanders). WAV-rapport, Leuven, Belgium.
- Van de Velde S., Huijts T., Bracke P. & Bambra C. (2013) Macro-level gender equality and depression in men and women in Europe. *Sociology of Health & Illness* **35** (5), 682–698.
- Van de Velde S., Bambra C., Van der Bracht K., Eikemo T.A. & Bracke P. (2014) Keeping it in the family: the self-rated health of lone mothers in different European welfare regimes. *Sociology of Health & Illness* **36** (8), 1220–1242.
- Van der Bracht K., Van de Putte B. & Van de Velde S. (2014) The worst of both worlds? Origin and destination effects on migrant religiosity. *Ethnic and Racial Studies* **37** (6), 998–1019.
- Van Esterik P. (1994) Breastfeeding and feminism. *International Journal of Gynecology & Obstetrics* **47**, S41–S54.
- Vanderlinden K., Levecque K. & Van Rossem R. (2015) Breastfeeding or bottled milk? poverty and feeding choices in the native and immigrant population in Belgium. *Journal of Immigrant and Minority Health* **17** (2), 319–324.

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