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**Breastfeeding duration:
The impact of maternal education and employment**

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Juggling work and home – breastfeeding duration and employment leave

Introduction

Growing policy attention has been paid to the nutrition of infants and the importance of breast milk for child development. Policy documents are based on a wealth of national and international research indicating the positive health outcomes of breastfeeding for mother and child (Fewtrell, 2004; Howie et al., 1990; Sadauskaite-Kuenhne et al., 2004; Wilson et al., 1998). At an international level, documents like the WHO *Innocenti Declaration* on Breastfeeding (WHO, 1990) and the European Commission's *Protection, promotion and support of breastfeeding in Europe (2004)* reflect the supranational impetus in promoting breastfeeding. At a UK wide level, this is seen with programmes such as the *UK Baby Friendly Initiative*.

In Scotland, breastfeeding promotion first arrived on the policy agenda with the launch of the Scottish Joint Breastfeeding Initiative in 1990 and following 15 years of policy development Scotland became the first nation to make breastfeeding a legal right in 2005 with the Breastfeeding etc. (Scotland) Act 2005. More recently, the *Better Health, Better Care Action Plan* (Scottish Government, 2007) and the the *Healthy Eating, Active Living* action plan (Scottish Government, 2008a; Scottish Government, 2008b) hope to see 32.7% of all infants being exclusively breastfed at 6-8 weeks by 2010-2011. To support this goal, a national Infant Nutrition Co-ordinator was appointed in May 2008, to lead the development and the implementation of an Infant Nutrition Strategy.

Despite these developments the most recent data shows that among children born in 2008, 45% were being breastfed (of which 37% exclusively) at the health nurse review 10 days after birth. Also at the 6-8 week review, 36% were being breastfed (of which 26.7% exclusively) indicating that figures remain unchanged relative to data available from 2001 (<http://www.isdscotland.org/isd/1761.html>, accessed May 2009). Furthermore, a recent report for the Scottish Government drawing on Millennium Cohort Data found that the notably lower uptake and duration of breastfeeding in Scotland compared to England, were not fully explained by the differences in the socio-economic circumstances of mothers in the two nations, but were due to a specific “Scottish effect”, or a collection of Scotland-specific socio-cultural elements which make mothers in Scotland less likely to breastfeed than their counterparts in England (Dex, 2008).

In light of the above this paper seeks to understand what factors make mothers in Scotland more likely to breastfeed for longer, looking at the effect of maternal education, age and family composition, but and paying particular attention to employment and leave from work.

Policy

International policy

In 1990, *The Innocenti Declaration* by WHO/UNICEF stated the need to approach global optimal maternal and child health. It stressed that infants should be fed *exclusively* on breast-milk from birth to 6 months and be weaned on complimentary foods alongside breast-milk ‘until the age of two and beyond’ (WHO, 2006). Renewed emphasis has been placed on the Innocenti Declaration recommendations by the more recent publication in 2003, *WHO Global Strategy for Infant and Young Child Feeding*. The strategy calls for governments to introduce

legislation protecting working women's right to breastfeed, and to ensure that the health sector will 'promote and support exclusive breastfeeding for six months and continued breastfeeding for up to two years and beyond' (WHO, 2006). At an EU level, the European Union's working group for the promotion of breastfeeding in Europe in large part reiterates the WHO targets (European Commission, 2004).

The WHO claims that 'exclusive breastfeeding from birth is possible for most women who choose to do so' (2006:2). However, this ignores the large number of mothers for whom exclusive breastfeeding is, albeit biologically 'possible', outright unfeasible or undesirable for different socio-cultural, economic or other personal reasons. Research has shown that breastfeeding difficulties can have adverse effects on the mother's psychological well-being, even leading to depression at times (Shakespeare & Garcia, 2004). Since the Innocenti Declaration the recommendation of *exclusive* breastfeeding up to six months remains unaltered. In light of research which reveals the difficulties in initiating and continuing breastfeeding, and in light of recent data which shows breastfeeding take up and duration is still low, it would appear that WHO and EU commission targets are highly, if not unrealistically, ambitious.

Scottish Policy

In Scotland, breastfeeding promotion first arrived on the policy agenda with the launch of the Scottish Joint Breastfeeding Initiative in 1990. In the 1994 Scottish Dietary Targets it was hoped breastfeeding take-up in the 6 weeks following birth would rise from 30% to 50% by 2005. In 1995, an appointed National Breastfeeding Adviser was to work with Local Breastfeeding Initiatives in raising awareness regarding breastfeeding benefits. The *Integrated Strategy for Early Years* in 2003 aimed to improve children's health, and increase the proportion of breastfeeding women (Scottish Executive, 2003). Indeed, Scotland became the first nation to make breastfeeding a legal right in 2005 with the Breastfeeding etc. (Scotland) Act 2005.

Recent Government policy has paid extensive attention to the importance of good nutrition in infancy and continues to stress the importance of promoting breastfeeding. The *Better Health, Better Care Action Plan* outlines how NHS boards will be expected to support breastfeeding so that one third of all infants are being exclusively breastfed at 6-8 weeks by 2010-2011 (Scottish Government, 2007). To support this goal, a national Infant Nutrition Co-ordinator was appointed in May 2008. The main role of the co-ordinator is to lead the development and the implementation of an Infant Nutrition Strategy. Consultation on a draft of the *Infant Nutrition Strategy* has already been sought (Scottish Executive, 2006b), and the strategy will be aimed at improving nutrition in infancy and improving children's chances for a healthy future. Apart from the 6-8 week breastfeeding target, advice for mother on the FSA's Eat Well Be Well website reiterates how 'current advice is to continue exclusive breastfeeding for six months' and that babies will need breast or formula milk until they are about 1 year of age (Food Standards Agency).

The WHO and Scottish Government recommendations are in agreement with respect to the benefits of breast-milk and the importance of facilitating more and longer breastfeeding. Until recently, they used to differ both on the issue of exclusivity and duration of breastfeeding. The WHO has strongly recommended exclusive rather than complimentary breastfeeding up to 6 months, while the Scottish Executive did originally not aim for exclusivity as such and aimed for increased take-up at 6 weeks. Since 2007, the Scottish Government has aligned its recommendations to those of the WHO with respect to exclusivity, but the official targets lie

at a rather less ambitious, and arguably more realistic, recommended duration of 6-8 weeks, with no specific Scottish targets set for feeding at 6 months.

Maternity leave

An exhaustive and historical review of current employment policy is not within the scope of this paper, but as the breastfeeding duration in relation to the mother's employment leave will be explored, a brief outline of the current maternity leave provisions is relevant. The UK wide Statutory Maternity Pay (SMP) covers 6 weeks where the mother is paid 90% of her average weekly earnings. After the first six weeks, mothers are entitled to a flat rate sum of £123.06/week for the remaining 33 weeks. Mothers who do not qualify for SMP and may be this case eligible for Maternity Allowance, which pays a weekly rate of £123.06 or 90% of average weekly earnings, whichever is smaller for 39 weeks (<http://www.hmrc.gov.uk/payee/employees/statutory-pay/smp-overview.htm>, accessed June 2009).

Many mothers, and especially higher earners and single mothers, may find that following the 6 weeks leave paid at 90% of their wage, the weekly pay for the remaining period will accumulate to a significantly reduced income, and returning to work may be appealing if not even necessary for financial reasons. The practical problems in combining work and breastfeeding, and simply the spatial separation between mother and child makes prolonged breastfeeding after returning to work difficult to maintain, and a number of studies have explored this.

Literature Review

Social class, income and education

Numerous studies have found that breastfeeding take-up and duration is influenced by the mother's socio-economic background and income. (Arlotti et al., 1998; Avishai, 2007; Bailey et al., 2004; Earland et al., 1997; Hamlyn et al., 2002; Houston et al., 1983; Jelliffe & Jelliffe, 1978; Jones et al., 1986). Research has unanimously highlighted how mothers in more privileged social classes and in higher income groups are more likely to both initiate breastfeeding and to continue to breastfeed for longer when compared to mothers in less privileged classes and those in lower income groups.

A few studies have also shown that the mother's education is an important influence in mother's breastfeeding patterns (Kelly & Watt, 2005; Ludvigsson & Ludvigsson, 2005; Martin & White, 1988; Papadimitriou et al., 2005; Power & Matthews, 1997; Scott et al., 2006), and there is a strong link between educational qualifications, income and social class. However, some research has indicated that the mother's educational background may be more important in understanding differences in breastfeeding patterns among mothers than occupation-based social class distinctions. A report based on the Scottish sample of the Millennium Cohort Study showed that social class, which on its own was a significant predictor of breastfeeding, was no longer significant when also controlling for the mother's educational qualifications in the regression model (Dex, 2008). Finally, research using Growing Up in Scotland data found that social class was an important predictor of breastfeeding take-up on its own but ceased to be significant when also controlling for the mother's educational qualifications. Examining the relative importance of maternal social class, household income and maternal education in predicting breastfeeding *duration* will be one of the aims in this paper.

Employment and employment leave

Several studies have indicated that a complete appreciation of why mothers breastfeed for shorter or longer periods of time needs to take into account the importance of the mother's employment (Cooklin et al., 2008; Earland et al., 1997; McKinley & Hyde, 2004; Rea et al., 1997; Roe et al., 1999). The idea that continued breastfeeding and returning to work present conflicting demands to mothers has been well researched in different countries and at different time-points.

A study carried out on data collected in 1993 in the USA showed that maternal employment leave was a significant predictor of breastfeeding duration, and that each week of work leave increased breast-feeding duration by almost half of a week (Roe et al., 1999). A similar study in Brazil looking at breastfeeding patterns among working women also found that maternity leave and flexible working conditions had a positive impact on breastfeeding duration (Rea et al., 1997). A study based on Australian survey data from 2004 looked at the impact of the maternal return to work and maternal employment status on breastfeeding duration at 3 and 6 months (Cooklin et al., 2008). The results indicated that mothers' return to work was associated with a premature cessation of breastfeeding, even after controlling for maternal age, education and an index for area deprivation.

The above reviewed paper by Roe et al (1999), for example, found that a mother who worked 8 hours every day when her infant was aged 3 months would feed her infant with breast milk on average 1.5 fewer times than a non-working mother. When the infant was aged 6 months, however, this difference was reduced, with the breastfeeding patterns of working and non-working mothers becoming more similar. Another study carried out on US survey data collected in 1988 found that the risk of giving up breastfeeding among mothers returning to work compared to non-working mothers is far greater in the first month of the child's life and decreased as the child ages (Lindberg, 1996).

In essence, it is fairly unsurprising that this negative impact employment is more pronounced in the earlier months of child's life when breastfeeding needs to take place very frequently. On the other hand, older infants, whether breastfed or not, will be gradually exposed to more varied diets including possibly formula milk or solids, and breastfeeding can take on a more complementary role in feedings and thus be more easily maintained among working as well as non-working mothers (Lindberg, 1996; Roe et al., 1999).

Other important factors

Most of the studies reviewed have also found certain characteristics of the mother or her immediate circumstances which are known to be related to both the take-up and duration of breastfeeding. In particular, the mother's age at birth, whether a mother has previous children, whether a mother is in a single parent household and the mother's ethnic background are known confounders in the analysis of breastfeeding trends (Bolling et al., 2007; Hawkes et al., 2004; Hirschman & Butler, 1981; Joshi & Wright, 2004). Research has found that older mothers, those who have had previous children, those living in a couple household, and those who are of non-white ethnic origins are more likely to breastfeed and continue to breastfeed for longer.

Theorising breastfeeding

The proposed theory for understanding breastfeeding patterns relies on a number of key theoretical building blocks. A starting point is the idea that the body is a social construct and

a product of social discourse (Foucault, 1986). As such, it is a vehicle for social meaning (Douglas, 1970). In light of this, there is a heightened reflexivity towards our own and others' bodies and also a desire to regulate it (Turner, 1992). As social beings, we may strive to 'civilise bodies' (Elias, 1982) by internalising socially constructed norms regarding 'appropriate' bodily behaviour, engaging with the body as we would with an unfinished project which can be developed to meet the expectations of a given society. Thus, in Giddens's words, every person is able to engage with their own 'project of the self' which is under continuous development (Giddens, 1991). Over more recent times, public discourse and social norms indicate that the pursuit of a healthy lifestyle and the prevention of avoidable ill-health are particularly important goals for the individual body project and a moral obligation for each individual towards society (Wall, 2001).

A key goal in the process of civilising bodies is the assimilation of appropriate gendered behaviour (Connell, 1987). In the current social discourse, breastfeeding and the 'breast-is-best' motto is promoted as the 'natural way' and most 'appropriate' way of rearing children for mothers. There is a moral value and symbolic meaning in the way a mother feeds her infant, and there is a notion of stigma and deviance which is associated with mothers who do not breastfeed (Murphey, 1999; Wall, 2001). Mothers who do not breastfeed often feel stigmatised and are at times portrayed as failing to live up to the social expectations of appropriate motherhood (Goffman, 1968). The importance of breastfeeding in the discourse of child health has grown recently, and emphasis on breastfeeding as a 'universal remedy', and the social anxiety this has created, sometimes overshadows the fact that several other factors tend to be more important in influencing child health outcomes (Blum, 1993; Maher, 1992).

This theoretical narrative, however, does not explain why different groups of mothers in society reflect these social norms in their own behaviour to different extents. Bourdieu and Passeron state that different societal groups will assimilate these social norms regarding the human body to different degrees and those in more privileged social, cultural and economic circumstances are more likely to aspire to set and achieve certain goals with respect to their body. This socio-economic capital facilitates the transformation of existing capital into physical capital, which is produced by maintaining a healthy and active lifestyle, in turn associated with overall better health outcomes (Bourdieu & Passeron, 1977). In line with this theory, Shilling has suggested that people with more economic, educational and social capital are more inclined to feel agency over their own destiny, and feel they are in control of their own lifestyle choices and health outcomes.

This goes some way in explaining why, compared to groups with less socio-economic and educational capital, those with more capital are more likely to opt for more 'preventative' lifestyles (Shilling, 1993). This may explain why it is usually mothers with more social and educational capital who strive to put public health recommendations into practice, and who, in light of the current health advice, attempt with more determination and conviction to breastfeed their children and to breastfeed for longer. Mothers rear children in ever changing social contexts, and recovering from a predominantly "bottle-feeding culture" is proving to be a slow process particularly among less privileged groups who lack the appropriate social resources and networks of significantly influential individuals who can help to make breastfeeding appear more appealing and approachable (Bailey et al., 2004).

This argument is supported by Avishai, who suggests that women in more privileged social classes are more likely attempt to breastfeed as a 'rational response' to the evidence based recommendations in the media and public discourse (Avishai, 2007). Resonating with Giddens's idea of the body-project (Giddens, 1991), Avishai suggests that mothers in more privileged social classes respond to the demands of motherhood by approaching breastfeeding as a 'body-management project' which has to be accomplished. Breastfeeding in itself is but one of many 'goals' which these mothers desire and feel they need to accomplish so as to live up to the cultural definition of ideal motherhood. These mothers are informed and aware about the latest scientific advice and they are likely to consider "living by the numbers" as a personal accomplishment (Avishai, 2007). In turn, as Blum describes, the medicalisation and social marketing of breastfeeding has given rise to a new 'breed' of mothers: the "breast-feeding wage-earning Supermom", who is prosperous, fit, healthy, and successful by contemporary social standards (Blum, 1999).

The existing theory is largely unanimous in stating that mothers with more 'social capital' are more likely to pursue health optimising behaviours, such as breastfeeding. However, ways of capturing differences in this 'capital' vary and social class, income and education have all been used as indicators. The research at hand aims, in part, to address this appeared overlap in categorisation based on education, social class and income. It is proposed that the mother's educational background, as opposed to her employment-related social class categorisation, or her income group, will be a better indicator of the differences in such 'capital' which in turn influence how long a mother wants to and is able to breastfeed for.

The processes by which women balance the employment-related and motherhood-related demands have often been theorised through the concept of 'role conflict', or 'role incompatibility' which states that women face incompatible and contradicting the demands from their roles as wage-earner and mother. The contemporary cultural definition of successful motherhood is ambivalent. Being independent and earning a wage through a career based *outside* the home is deemed an equally important facet of 'good' motherhood as is providing children with the best possible nutrition in infancy by breastfeeding for extended periods of time. Needless to say, mothers find balancing these roles challenging (Blum, 1993; Lindberg, 1996). As Blum states, 'women must climb the ladder of occupational mobility, look good doing it, AND provide breast milk for their babies' (Blum, 1993:306).

Stating that mother's face contradicting social demands explains why many mothers nevertheless strive to meet these demands, or why they may feel less successful if they have to prioritise their employment-role over their motherhood-role or vice versa. However, the apparent incompatibility of these two roles is not a 'natural' or unavoidable aspect of breastfeeding but purely a result of the way the paid-labour and unpaid-care work has been dichotomised in modern society. If mothers were to bring the *private* practice of breastfeeding into the *public* workplace, they would be challenging the idea that work and family life each belong to two separate domains (Lindberg, 1996).

In the current context, generous employment leave allows mothers to postpone their engagement in their public role as wage-earners by securing an "extension" to their private roles as mothers, thus making it easier to concentrate on motherhood and continue breastfeeding. However, the two realms of employment and care are still kept separate, and employment leave allows a mother to *suspend* her role as worker, but it does not allow her to actually *combine* her worker and mother roles.

Aims

This paper aims to explore how factors such as education, social class and income influence the duration of breastfeeding among mothers in Scotland, and more particularly how employment and employment leave affect prolonged breastfeeding. It is expected that factors such as maternal education will be of great importance in explaining breastfeeding duration, and potentially more useful than social class and income. It is hypothesised that more educated mothers will be more likely to breastfeed for longer, as these mothers are more likely to be aware of and exposed to official recommendations in health policy as well as being more susceptible to social norms mediated in public discourse which portray breastfeeding as key to 'good' and 'successful' motherhood. It is also hypothesised that longer spells of breastfeeding will be more prevalent among mothers who take longer leave from work. It is presumed that employment leave enables a mother to spend more time with her infant making it easier to maintain breastfeeding over a longer period of time.

Methods

There are essentially 2 different types of sources for breastfeeding data in the UK; these are a) administrative data and b) survey data. The Infant Feeding Survey (IFS) for the UK is based on administrative data and has been running every five years since 1975. The results are arranged by nation, so Scotland specific trends can be derived. The Millennium Cohort Study (MCS) launched in 2000 collects a broad range of information on the child cohort it follows, including information on whether the child was breastfed. As the MCS has a boosted sample for Scotland, it too can be used for the analysis of Scotland specific trends. The Growing Up in Scotland longitudinal survey adopts a similar format to the MCS but is specifically tailored to survey children as they grown up in a Scottish cultural and policy context. Given the desire to explore breastfeeding trends specifically in Scotland, the GUS survey was the favoured source of data for the research.

The official user guide for the first sweep of GUS (Corbett et al., 2007) describes the survey design in great detail, and this paper will only describe it briefly. GUS follows 2 separate cohorts through annual survey sweeps. The baby cohort consists of 5217 babies who were born between June 2004 and May 2005 and who were c. 10 months old at the time of the first sweep. The toddler cohort consists of 2858 toddlers born between June 2002 and May 2003, who were c. 34 months old at first survey sweep. The sample was based on the Child Benefit Register held at the Department of Welfare and Pensions. The sampling frame was stratified and aggregated into Data Zones¹ which were in turn sorted by Local Authority and by the Scottish Index of Multiple Deprivation score. From this hierarchically sorted list, 130 zones were randomly selected (Anderson et al., 2007). Given the nature of the sampling procedure, the appropriate sample weights provided were used for the following analysis to correct for non-random non-response bias, and for unequal probability of selection for some children.

The survey interviews based on Computer Assisted Personal Interviewing (CAPI) and were carried out in the sample child's home with the child's main carer, which was primarily (99% of cases) the child's natural mother. Information on breastfeeding duration was only recorded for the baby cohort, and this will be the only cohort used for the following analysis. Cases where the partner was interviewed and where the mother was not the biological mother of the child were excluded from analysis. Also, cases where sampled birth was a multiple birth (e.g.

¹ Data Zones are units created by the Scottish Executive, now the Scottish Government, for reporting 2001 Census small area statistics.

twins) were also excluded. A total remaining sample of 5051 babies with a valid duration for breastfeeding were included in the analysis. Of these babies, 3034 were breastfed at least once, and it is this subsample which is used for the analysis of breastfeeding duration.

GUS collects information on a range of topics, including questions on breastfeeding practise. The mothers of the baby cohort were asked whether they had ever breastfed the sample child, even if only at one time. Those who had breastfed, were then asked to report how old the child was when it was last breastfed. As the children were 10 months old at the time of interview, 481 (16%) babies were still being breastfeed. The mothers still breastfeeding at the first sweep were asked again in sweep 3 how old the child was when it was last breastfed and a final duration for breastfeeding was obtained for all mothers still participating in the survey in sweep 3.

As the policy review indicated, current Scottish breastfeeding targets refer to exclusive breastfeeding. As the GUS questionnaire was designed prior to the establishment of these targets, and as the previous targets referred to *complementary* breastfeeding, the GUS survey only enquired about complementary breastfeeding. Figures for complementary breastfeeding will include mothers who breastfeed exclusively as well as those who feed their child with a mixture of breast and formula milk. Figures for complementary breastfeeding are typically much higher than those for exclusive breastfeeding, and table 1 illustrates this difference using 2005 Infant Feeding Survey and GUS data. It could be argued that not having data on exclusive breastfeeding is a drawback, but looking at complementary breastfeeding allows for an analysis of duration to look at a much larger number of mothers and a much longer period of time. This means that a more complex analysis can be carried out and more meaningful results can be obtained regarding the factors which influence breastfeeding duration.

Table 1 Exclusive and Complementary breastfeeding

Comparing Exclusive and Complementary breastfeeding between GUS and IFS 2005 duration in % among all mothers			
	GUS - comp. ¹	IFS 2005 ² - comp.	IFS 2005 ² - excl.
Breastfed initially	60	70	61
At 1 week	52	57	42
4 weeks	45	n/a	25
6 weeks	42	44	19
8 weeks (2 months)	38	n/a	17
17 weeks (4 months)	30	31	6
26 weeks (6 months)	23	24	<0.5

¹ Filtered for single births and biological mothers, weighted data

² Infant Feeding Survey - Scotland sub-sample

Apart from questions on breastfeeding, GUS collects a vast range of demographic variables on income, education, occupation and social class. Table 2 lists all the variables explored in the analysis. It shows rates for breastfeeding take-up, duration under 6 weeks and duration for 6 weeks or more. A shaded column also shows how many mothers breastfed for over 6 months (these are included in the category of those breastfeeding for 6 weeks or more) to enable comparison with current WHO recommendations, even if these refer to exclusive breastfeeding rather than complementary. Variables explored include the mother's highest educational qualifications held when the child was born, as well as the total household income at sweep 1 in quartiles. A variable measuring the mother's social class (NS-SEC), based on information regarding working conditions, information regarding job security,

payments and opportunities for promotion, was also explored (Rose & O'Reilly, 1998). In the present analysis, non-working mothers were grouped with those in the 'semi-routine and routine occupations' category for social class.

Table 2 Breastfeeding initiation and duration by variables of interest

(Filtered for single births and biological mothers, weighted data)	At birth	Less than 6 weeks	6 weeks or more	6 months or more
Mothers who breastfed their child (%)				
All mothers (N: 5051)	58.8	17.8	40.1	22.7
Parity (N: 4369)				
First birth (N: 2105)	64.5	21.3	43.2	22.5
Subsequent birth (N: 2264)	59.3	14.8	44.2	27.1
Mother's age at birth ¹ (N:5050)				
Under 20 (N:347)	32.7	18.7	14.0	2.6
20 to 29(N:2052)	52.9	19.0	33.9	15.3
30 to 40 (N:2480)	68.0	17.1	50.2	31.6
40 or older (N:171)	71.4	10.2	60.2	43.4
Family status (N: 5051)				
Couple household (N:4093)	65.0	18.1	46.9	27.0
Single parent household (N:958)	35.1	16.8	18.2	6.3
Mother's ethnic background (N: 5048)				
White (N: 4861)	58.1	17.8	40.4	22.2
Other (N: 187)	75.1	20.45	54.7	34.4
Mother's Education (N:4358)				
Degree or Equivalent (1287)	85.6	15.0	70.6	48.1
Vocational qualification below degree (1637)	59.7	21.2	38.5	19.4
Higher grade or equivalent (369)	63.6	19.6	44.0	22.9
Standard grade or equivalent (732)	41.9	18.0	24.0	8.1
No qualifications(333)	28.6	11.6	17.0	7.0
Mother's social class (N:5044)				
Managerial and professional (1816)	76.4	17.2	59.2	36.3
Intermediate (983)	59.3	19.2	40.1	19.9
Small employers and own account workers (196)	72.2	15.1	57.1	35.3
Lower supervisory and technical (305)	46.5	17.2	29.3	16.9
Semi-routine and routine (1744)	42.5	17.9	24.6	11.1
Annual household income – Quartiles (N:4534)				
Up to £14,999 (1315)	39.4	16.8	22.6	9.7
£15,000 - £25,999 (1131)	57.3	20.0	37.2	19.4
£30,000 – £43,999 (1265)	68.5	17.8	50.7	30.2
£44,000 or more (823)	79.7	15.8	63.8	38.2
Employment type (N: 3611)				
Employee (3421)	64.2	19.0	45.2	24.5
Self-employed (190)	73.5	16.4	57.1	36.2
Working status at time of birth (N: 4368)				
Working (part- or full-time) (2684)	68.5	19.3	49.2	27.6
Not working (1684)	51.3	16.0	35.3	20.6
Leave from work - paid and unpaid - sw1 (N: 3110)				
No leave - up to 1 month (53)	52.1	7.1	45.0	23.2
Over 1 month – up to 2 months (75)	65.9	25.1	40.8	19.3
Over 2 months – up to 3 months (129)	58.5	22.6	35.9	17.4
Over 3 months – up to 4 months(164)	54.9	20.5	34.4	13.0
Over 4 months – up to 5 months (310)	62.9	22.7	40.2	19.6
Over 5 months – up to 6 months (1293)	63.2	20.4	42.8	21.4
Over 6 months (790)	74.6	15.9	58.7	36.4
Still on leave at sweep 1 (296)	72.8	14.3	58.5	40.0

¹ Mother's age was inserted as a continuous variable in the regression analysis

The impact of employment leave and employment on breastfeeding duration was of great interest and the impact of whether a mother was employed prior to birth and whether she is an employee or self-employed was explored. Mothers working, illustrated in table 2 include those working part- and full-time. A variable measuring all paid and unpaid employment leave taken by the mother was also controlled for. This is banded in monthly intervals, with a final interval of those taking 6-10 months leave, and a category which accounts for those mothers who were still on leave at the first sweep of the survey, when the child was 10 months. At the second sweep, the mothers who were still on leave at sweep 1 were not asked further questions regarding their total employment leave, and so the impact of employment leave on breastfeeding duration can only be examined up to the point where the babies are aged 10 months. For this reason, and given that a central aim of the paper was to assess the impact of employment leave on breastfeeding duration, only the duration spanning from 1 day to 10 months inclusive was analysed and mothers who breastfed for longer were included in the analysis but censored at 10 months.

Statistics

Stata version 10.1 (StataCorp, College Station, TX, USA) was used for all analysis. Given the nature of the data being duration data, survival analysis through Proportional Hazards (Cox) Regression was the preferred method for testing explanatory models for breastfeeding duration. The first stage of analysis involved comparing the survival rates for different categories of single independent variables through Kaplan-Meier plots. A selection of these is presented (figures 1 to 3). Figure 1, for example, indicates the different rates of breastfeeding *cessation* between single mothers and those in couple households, and suggests that mothers in single parent households are more likely to stop breastfeeding sooner. The tests of equality of these curves, i.e. whether the difference in cessation rates was statistically significant were carried out using the log rank test, and significance values are shown in the left bottom corner of each plot.

Following the univariate analysis a selection of significant variables were combined to form and test a series of multivariate explanatory models. These provide hazard ratios for the cessation of breastfeeding for each category of the independent variable adjusted for each variable controlled for in the model. The hazard ratios (and 95% confidence intervals) are interpreted in an analogous ways as odds ratios from logistic regression results would be. A hazard ratio larger than 1 implies a larger probability of earlier cessation of breastfeeding for the category in question, while a ratio lower than 1 represent of lower risk of early breastfeeding cessation, when compared to the set reference category of that variable.

Cox Proportional Hazards regression relies on the assumption that the difference in the rate of breastfeeding cessation between groups is proportional over the whole duration of breastfeeding time (Cleves et al., 2008). Along with the visual examination of survival plots, tests of proportionality of assumptions using saved scaled schoenfeld residuals were carried out for each model to assess whether this assumption was being violated by any of the categories of any of the independent variables. After a model was considered finalised, the final version was re-run on weighed data, thus adjusting the results to the stratified sample design.

Figure 1 Survival plot for breastfeeding duration by family status

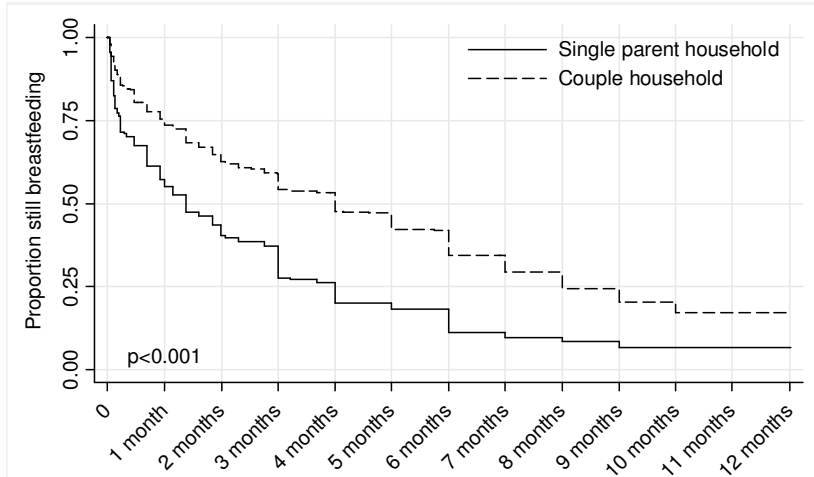


Figure 2 Survival plot for breastfeeding by parity

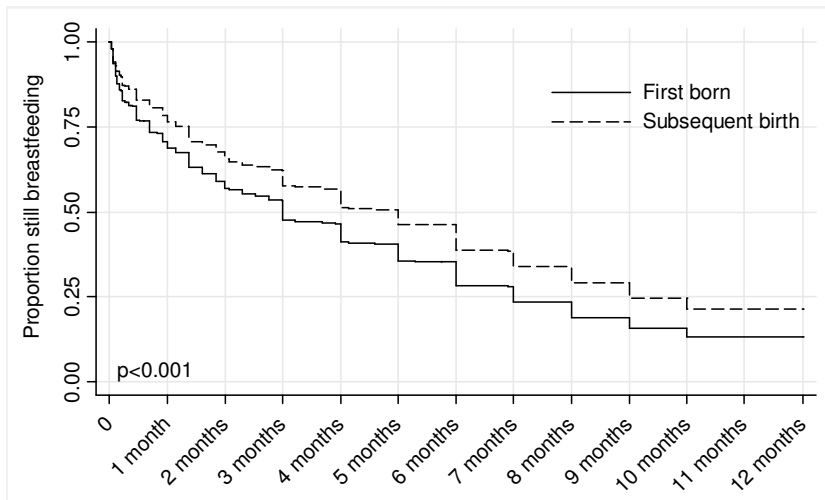
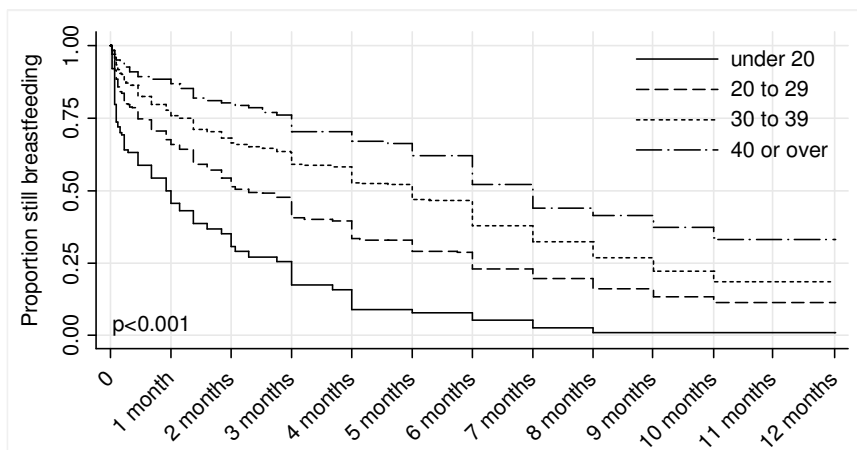


Figure 3 Survival plot for breastfeeding by mother's age at birth



In preliminary proportional hazards regression models, the relative importance of social class, income and education in predicting breastfeeding duration were tested. Each variable was significant in a univariate model but when the three variables were combined in a regression model, social class and income were no longer significant, but maternal education remained a significant and robust predictor.

A progression of two final proportional hazards regression models is presented in table 3. The first stage tests the effect of education, age, parity, family status, mother's ethnicity, and employment status prior to birth, while at the second stage the model also adjusted for the mothers employment leave, while ethnicity and employment status were dropped as they were no longer significant. Furthermore, while the reviewed literature and univariate analysis indicated that a mothers type of employment, i.e. being self-employed or an employee, would influence breastfeeding duration, this variable was not significant when controlling for additional factors in a multivariate model.

Results & Discussion

General background characteristics

The proportional hazards regression results show that the mother's age when giving birth is a significant predictor. In fact, for every year increase in age, a mother has a 3% lower risk of earlier breastfeeding cessation, after controlling for the remaining variables. Older mothers have been known to breastfeed for longer, and this may in part a result of more life-experience and more self-confidence, while older mothers are also more likely to be more educated and in better paid and more maternity friendly jobs. First-time mothers had a 20% higher risk of stopping to breastfeed sooner than mothers with other children, and the literature reviewed suggested how mothers often wished and tried to breastfeed subsequent babies for longer drawing on experiences from the first birth.

Furthermore, single mothers were also more likely to stop breastfeeding sooner when compared to mothers in couple households. This may be because single mothers have to face the numerous demands of child rearing single-handedly, and being left with relatively *less* time and resources, it may be that prolonged breastfeeding is harder to maintain for these mothers. Finally, as previous literature unanimously indicated, mothers categorised as belonging to non-white ethnic backgrounds were more likely to continue to breastfeed for longer compared to 'white' mothers. This may have something to do with mothers from ethnic minorities having relatively more breastfeeding friendly experiences, attitudes and cultures when compared to other mothers. However, when controlling for employment leave in the second regression model, ethnicity was no longer significant.

Education, income and social class

The results from the preliminary and exploratory models indicated the predominance of maternal education as a predictor of breastfeeding duration, when compared to social class and household income. The relative importance of education to social class as a basic explanatory factor of breastfeeding *initiation* among mothers in Scotland has been discussed in previous research looking at Scottish trends (Skafida, 2009). The current results suggest that education remains a more useful explanatory variable than social class or household income for understanding and explaining differences in the *duration* of breastfeeding as well.

Clearly, there is a relationship between social class and education, with more educated mothers being more likely to be in more privileged social class categories and higher income

groups. Ultimately, income, class or education can each be seen as proxy variables capturing broader differences in social capital which in turn explains differences in breastfeeding trends. However, the results suggest that a distinction based on educational backgrounds can go further in explaining differences in breastfeeding duration than a distinction based on mother's social class categorisation, or on their household income. As suggested by Skafida (2009) the longer time spent in formal education might make mothers better equipped to self-educate themselves on topics such as infant nutrition, and make them more aware of and prone to respond to recommendations regarding optimal infant feeding.

Table 3 Hazard Ratios for breastfeeding duration

(Filtered for single births and biological mothers, weighted sample)	MODEL 1	MODEL 2
	Hazard Ratios (95% CI)	Hazard Ratios (95% CI)
<i>Variable reference categories in italics</i>		
Breastfeeding duration up to 10 months	N:2742	N:1917
Mothers Education		
<i>Degree or equivalent</i>		
Vocational qualifications below degree ¹	1.57 (1.41-1.74)***	1.47 (1.30-1.66)***
Higher grade or equivalent	1.42 (1.25-1.61)***	1.44 (1.22-1.71)***
Standard grade or equivalent	2.09 (1.77-2.46)***	1.89 (1.54-2.30)***
No qualifications	2.08 (1.66-2.62)***	1.79 (1.18-2.70) **
Mothers age (in years)	0.97 (0.96-0.97)***	0.97 (0.96-0.97)***
Parity		
<i>Subsequent birth</i>		
First birth	1.20 (1.10-1.30)***	1.21 (1.11-1.31)***
Family status		
<i>Couple household</i>		
Single parent household	1.20 (1.03-1.41) **	1.36 (1.10-1.69) **
Mother's ethnic background		
<i>Other</i>		
White	1.28 (1.03-1.60) **	<i>not included</i>
Working status at time of birth		
<i>Not working</i>		
Working (part- or full-time)	1.30 (1.17-1.44)***	<i>not included</i>
Leave from work (paid and unpaid)		
<i>Still on leave at sweep 1</i>		
None/up to 1 month	<i>not included</i>	1.27 (0.87-1.85)
Over 1/up to 2 months		1.82 (1.31-2.54)***
Over 2/up to 3 months		1.79 (1.35-2.37)***
Over 3/up to 4 months		1.85 (1.32-2.60)***
Over 4/up to 5 months		1.71 (1.40-2.10)***
Over 5/up to 6 months		1.55 (1.27-1.89)***
Over 6/up to 10 months		1.22 (1.01-1.47) **

¹ Hazard ratio for this category is not reliable as the assumption of proportionality is not met

** significant at p≤0.05

*** significant at p≤0.001

The proportional hazards regression models and hazard ratios presented in table 3 provide more detail regarding the nature of the relationship between education and breastfeeding duration. The first model indicates that, when controlling for the mother's age, parity, family status, ethnicity and working status prior to birth, education remains a significant predictor of breastfeeding. More specifically, compared to mothers with degree qualifications or equivalent, mothers with no qualifications have a 100% greater risk (risk ratio of 2:1) of ceasing to breastfeed sooner. A discrepancy can also be noted when comparing mothers with higher grade or equivalent qualifications, who, compared to degree-holding mothers, have a 40% higher risk of earlier breastfeeding cessation.

Employment and employment leave

The 1st regression model also looks at the impact of the mother's working status on breastfeeding duration. Before examining the hazard ratios, a quick look at table 2 will indicate that working mothers appeared more likely to breastfeed for 6 weeks or longer, and 49.2% of working mothers breastfed up to or beyond this point compared to 35.3% of non-working mothers. This would seem to contradict any theory which argues that work and breastfeeding are incompatible. However, employment is also correlated with education, income and age, which are all in turn related to longer breastfeeding. The proportional hazards regression models account for the effects of these known confounders. Model 1 shows that, after controlling for the effects of the remaining variables in the model, working mothers have a 30% higher risk of earlier breastfeeding cessation when compared to non-working mothers.

The second model looks into greater detail at the influence of employment leave. As this model only focuses on working mothers, the sample size is reduced, and the variable indicating employment status is not included in the model. The results are, perhaps unsurprisingly, in tune with previous research. Compared to mothers who were still on leave when the child was aged 10 months, mothers who took up to 2 months of leave had an 80% higher risk of early breastfeeding cessation. In contrast, those who took up to 6 months of leave had a 55% higher risk of earlier cessation, and those who took over 6 and up to 10 months of leave had a 22% higher risk of earlier cessation of breastfeeding. As the literature indicated, the risk of breastfeeding cessation was greater if returning to work when the child was younger. This is potentially due to the fact that as infants age they will all, whether breastfed or not, be more likely to be feeding on a mixed diet, and even among breastfed babies, breast milk may become a more complementary form of feeding, which is easier to maintain even after returning to work. On the contrary, babies who feed on formula milk at a young age often reject subsequent breast milk altogether, thus a mother returning to work when the child is very young may not be able to maintain prolonged breastfeeding (Lindberg, 1996; Roe et al., 1999).

The results regarding employment and leave are in unison with findings from the reviewed literature. They also resonate with social theories which argue that the demands of work and motherhood are difficult to juggle. Mothers might be keen to cultivate both their career and motherhood roles but the obstacles in juggling these roles are primarily cultural and social, and only secondarily practical, spatial and financial.

The results indicate that delaying the return to work is will facilitate prolonged breastfeeding. In light of current healthy policy recommendations and given that mothers are unlikely to be

able to combine breastfeeding and employment, it would be presumed that nutrition policy and employment policy would be in harmony with each other. From a financial perspective, however, this option seems relatively unattractive. After the first 6 weeks of Statutory Maternity Pay, the relatively ungenerous income is likely to mean that mothers and families will have to rely on savings in order to maintain their life-styles after the 6 week period – or return to work. A more generous maternity leave scheme, such as the Swedish one which pays 80% of the mother’s average wage for the first 13 months of leave, would perhaps be more likely to promote prolonged leave and prolonged breastfeeding.

Having said the above, however, many mothers do want to return to work, and they should be able to continue to work without feeling that this comes at a cost of any aspirations they may have as mothers. From a spatial and practical perspective, breastfeeding quite simply requires the mother and infant to be in close proximity throughout the working day. This proximity could be achieved with more work-based crèches, flexible working hours, and an employment culture which would provide mothers with adequate time and resources to combine work and breastfeeding (Cooklin et al., 2008; Roe et al., 1999). However, from a social perspective, the socially constructed idea that motherhood and breastfeeding are a private affair and not appropriate in the public place of employment are probably a bigger obstacle to reconciling work and breastfeeding than the actual practical and spatial obstacles would be. Thus, the “choice” between work and motherhood as such, is really more of ‘non-decision’ rather than a choice as such.

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