

**Social inequalities
and differences in
social characteristics in
infant feeding practices
among Norwegian
6 months old infants –**

Spedkost 2006

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May 2009**



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Master thesis

by

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Summary

Background: Reducing health inequalities is highly ranked on the health policy agendas of European countries. Numerous scientific studies show that low socioeconomic status is associated with poor health. A social gradient is seen in diet quality and may contribute to inequalities in health. Infancy and childhood are characterized by rapid growth and development. An adequate diet during this period is of great importance for the child's health condition and may be crucial for future health. Because of social inequalities not all children have the same opportunities for good health. With regard to this and the nutritional influence on development of disease, it is interesting to investigate the existence of social inequalities and differences in social characteristics regarding important nutritional behaviours among Norwegian infants.

Subjects and methods: The analyses were performed on the data from the Spedkost 2006 survey conducted in Norway. A random sample of 3000 mothers of 6 months old infants were invited. 1986 consented for participation. A self-administered semi-quantitative food frequency questionnaire (SFFQ) was used. The SFFQ included questions on anthropometric values of the infant, demographic variables, diet related questions on breastfeeding, formula/other milk, solid foods and vitamin-mineral supplements in addition to socio-demographic questions on the mother and the father. Multiple logistic regression analyses were performed to examine the association between the infant's feeding practises and social inequalities and differences in social characteristics. The variables used for this examination were: maternal and paternal educational level, maternal age and working situation before giving birth, marital status and degree of urbanization in addition to the mother's smoking status. Infant feeding practices studied were: exclusive and total breastfeeding at infant age of 1 week, 4 weeks, 4- and 6 months, and at 6 months of age, introduction to solid foods, no daily or weekly use of sugar-sweetened drinks and vitamin D supplementation.

Results: Social inequalities were seen in exclusive breastfeeding at 1 week, 4 weeks and 4 months, breastfeeding at 4 weeks, 4- and 6 months, no daily or weekly use of

sugar-sweetened drinks and in the use of vitamin D supplements. Increasing maternal and paternal education was associated with infants fed more in line with the Norwegian national recommendations. All the examined infant feeding practices, except for exclusive breastfeeding at 1 week, showed associations to one or more social characteristic(s). Infants of older mothers and mothers employed before giving birth, of those not smoking, living together with a partner and in a more urbanized area had a healthier diet.

Conclusion: There are a number of vulnerable groups in the Spedkost 2006 survey that have shown to be at increased risk of not following the Norwegian infant feeding recommendations. In conclusion, intervention to improve adherence to infant nutrition recommendations needs to be particularly targeted and prioritized towards those being socially disadvantaged.

Sammendrag på norsk

Bakgrunn: Mange europeiske land har utjevning av helseforskjeller høyt oppe på den helsepolitiske agenda. Flere vitenskapelige studier viser at lav sosioøkonomisk status er assosiert med dårlig helse. Sped- og småbarnstiden er preget av rask vekst og utvikling. Et godt kosthold i denne perioden er av stor betydning for barnets helsetilstand og kan være avgjørende for framtidig helse. Sosiale ulikheter gjør at ikke alle barn har samme muligheter for å ha en god helse. Med tanke på dette og ernæringens betydning for sykdomsutvikling er det interessant å undersøke om det er sosiale ulikheter og forskjeller i sosiale karakteristikk når det gjelder viktige kostholdsadferder blant norske spedbarn.

Utvalg og metode: Data fra undersøkelsen Spedkost gjennomført i Norge i 2006 ble brukt som utgangspunkt for analysene. Et randomisert utvalg på 3000 mødre til 6 måneder gamle spedbarn ble invitert. 1986 gav deltagelsessamtykke. Deltagerne fylte ut et selvadministrert semi-kvantitativt matvarefrekvensskjema. Spørreskjemaet inneholdt spørsmål om spedbarnets vekt og høyde, demografiske variabler, samt kostholdsrelaterte spørsmål om amming, morsmelkerstatning eller annen melk, fast føde og vitamin- og mineraltilskudd. I tillegg ble det spurt om mors og fars sosiodemografiske bakgrunn. Multippel logistisk regresjon ble brukt for å undersøke potensielle sammenhenger mellom spedbarnets spisevaner, sosiale ulikheter og forskjeller i sosiale karakteristikk. Variabler som ble inkludert i analysene var mors og fars utdanningsnivå, mors alder samt arbeidssituasjon før fødsel, sivilstatus og grad av urbanisering på hjemstedet i tillegg til mors røykestatus. Kostholdsadferder som ble undersøkt var fullamming og amming da spedbarnet var henholdsvis 1 uke, 4 uker, 4- og 6 måneder. Ved sistnevnte alder ble også introduksjon av fast føde, ingen daglig eller ukentlig bruk av sukkerdrikke og bruk av vitamin D-tilskudd undersøkt.

Resultater: Sosiale ulikheter ble sett i fullamming ved 1 uke, 4 uker og 4 måneder, amming ved 4 uker, 4- og 6 måneder, ingen daglig eller ukentlig bruk av sukkerdrikke og ved bruk av vitamin D-tilskudd. Mors og fars økende utdannelse var assosiert med at spedbarna fikk et kosthold etter de norske anbefalingene for

spedbarnsernæring. Alle analyserte kostholdsvaner hos spedbarn utenom fullamming ved 1 uke, viste assosiasjoner med én eller flere sosiale karakteristikk. Spedbarn som hadde eldre mødre og mødre som var i arbeid før de fødte, som hadde ikke-røykende mødre og som bodde i mer urbaniserte områder hadde et sunnere kosthold.

Konklusjon: I Spedkost 2006 finnes det flere sårbare grupper som har blitt vist å ha en økt risiko for å ikke følge de norske anbefalingene for spedbarnsernæring. Som konklusjon, intervensjoner for å følge de norske kostholdsanbefalinger for spedbarn må være særlig prioritert og målrettet mot grupperinger med lavere sosial status.

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1. Semi-quantitative food frequency questionnaire (SFFQ)
2. Approval from the Regional Ethics Committee for Medical Research

Abbreviations and definitions

AAP	American Academy of Pediatrics
ADHD	Attention-deficit/hyperactivity disorder
ANOVA	Analysis of variance
CI	Confidence Interval
FFQ	Food frequency questionnaire
KiGGS	The German Health Interview and Examination Survey for Children and Adolescents
LSCDQ	The Longitudinal Study of Child Development in Quebec
MIN	Minimum value
MAX	Maximum value
N	Number of individuals
NOK	Norwegian kroner
OR	Odds ratio
ORS	Oral Rehydration Solution
SD	Standard deviation
SEP	Socioeconomic position
SES	Socioeconomic status
SFFQ	Semi-quantitative food frequency questionnaire
Spedkost	National dietary survey in Norway among 6- and 12- months old children carried out in 1998/1999 and 2006/2007
SPSS	Statistical Package for the Social Sciences
SSB	Statistics Norway (Statistisk Sentralbyrå)
U.S.	United States of America

WHO World Health Organization

1. Introduction

University of Oslo on behalf of Norwegian Directorate of Health and Norwegian Food Safety Authority conducted the Spedkost 2006/2007 survey. Spedkost 2006/2007 is the second national dietary survey in Norway among infants. As part of the national food surveillance system in Norway, the first national dietary survey among infants was carried out between 1998 and 1999 (1;2). It was conducted as a contribution to establish a system for monitoring infant feeding practices regularly, to assess trends and evaluate actions (3). The main objective of the infant surveys was to establish knowledge of children's dietary habits and eating pattern on a nation-wide basis, and elaborate updated dietary recommendations to promote a healthy lifestyle in this age group.

A cohort of infants was examined at two time points; when they were 6 months old in 2006 and when they were 12 months old in 2007. When referring to Spedkost 2006 in the present thesis, it only includes data from the 6 months old infants.

The master student has conducted all statistical analyses. However, the data collection was not a part of the thesis.

2. Background

2.1 Social inequalities and health

Reducing health inequalities is highly ranked on the health policy agendas of European countries (4). Research has documented correlations between social inequalities and health conditions, which create social health inequalities (5;6). E.g. Norwegian women and men having university or college education were 15 per cent more likely to report very good or good health compared to those who had not completed high school (Figure 1).

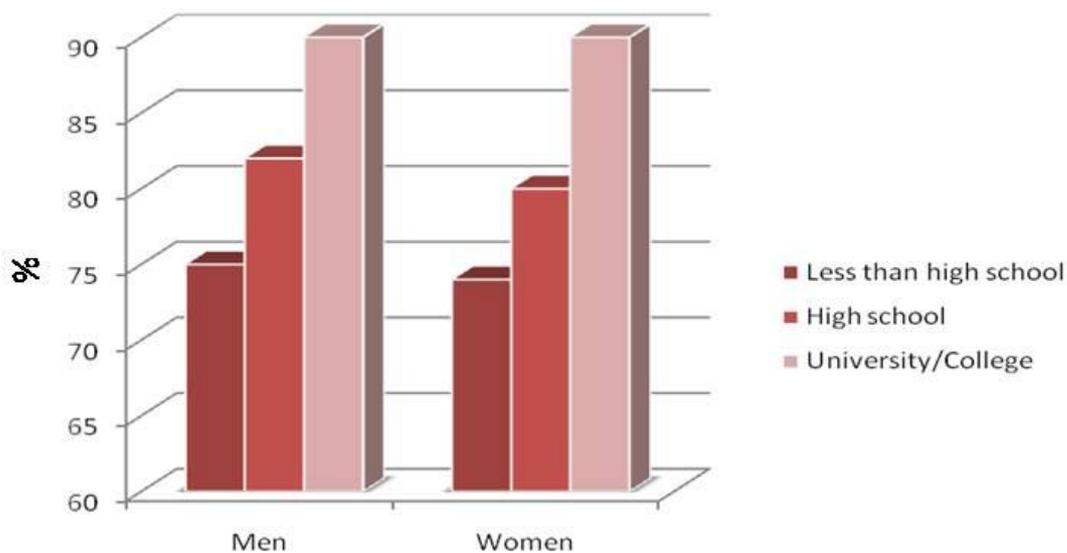


Figure 1. Self reported very good/good health in percentage among Norwegian men and women aged 25-64 in 2002 according to educational level (6).

These social health inequalities are manifest in all age groups and both genders. The differences are related to a whole variety of socioeconomic indicators: education, income, occupational class/group, employment status and area of residence (5;6). Additionally, the inequalities form a social gradient; the greater the gap in social status, the more unevenly health quality is distributed (7).

The Norwegian population has one of the world's highest life expectancies, generally a good health and during the last 30 years the health conditions have improved in almost every social group in the society (8). In spite of this, a report from 2003 found that health improvements have not been of the same magnitude among the social groups. The risk for premature mortality among those who have a lower education is higher compared to those being well education (Figure 2).

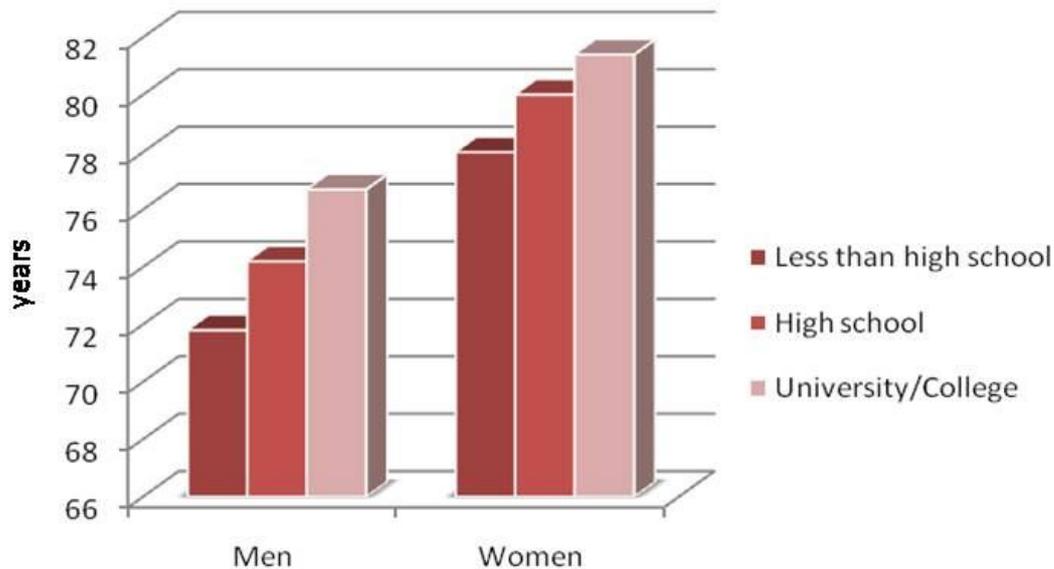


Figure 2. Life expectancy in years for 30 year olds in 1990 among Norwegian men and women according to educational level (6).

The socioeconomic health inequalities in Norway are actually greater than in many western countries. International comparisons performed by Mackenbach and co-workers found the relative inequalities both in self-reported health and mortality to be larger in Norway and Sweden than the rest of Western Europe (9).

Numerous scientific studies show that low socioeconomic status is associated with poor health in the life course. Infant mortality is socially graded (10). In socially disadvantaged populations, there is a higher risk of chronic diseases in childhood (11;12). In adult age, the risk of diseases like depressive disorders and cancer is higher in socially disadvantaged populations when compared to those with higher socioeconomic status (13;14).

Health differences create challenges for public health, which may be manifested as (5): (i) lives lost and reduced life expectancy, (ii) reduced quality of life and well-being, and (iii) economic expenses due to disability pensions and sickness absence. The reduction or avoidance of the inequalities will have a large impact on the general public health.

2.1.1 Social health inequalities and children

In the Governments White Paper No. 20 to the Storting - “National strategy to reduce social inequalities in health”, different areas of equalization are identified (15). One goal is to reduce social differences that contribute to different health qualities. They state that social health differences occur already during childhood. Furthermore, children’s living conditions and early environments may affect e.g. education and occupational opportunities later in life. That again influences health in adult age. An early effort is necessary to prevent these inequalities (15).

2.1.2 Social health inequalities and nutrition

Health determinants of great importance for public health in Norway have been identified and several are nutrition related like alcohol consumption, overweight and obesity, type 2 diabetes mellitus, high blood pressure and cholesterol levels (6). All these factors seem to follow a social gradient, the more educated a person is the more likely he/she is to have a profile of healthy behaviours (6). The above mentioned nutrition related health determinants could be of greater importance among children and youths than among adults because these risk factors usually are preserved or will be magnified throughout the children’s life span (6). The social inequalities in behaviour already manifested in childhood may enhance in adulthood and create a social morbidity or mortality gradient in the population (6).

2.1.3 Definition of social inequalities

Studying social inequalities in health is based on the assumption that our society is a socioeconomical hierarchy (16). Placing somebody in this hierarchy is done by choosing some kind of classification variable for socioeconomic position. Numerous indicators of socioeconomic position (SEP) are found in literature (17), and there is

no single best indicator suitable for all study aims (18). When examining inequalities in childhood, parent's education, parent's occupation, household income and household conditions; which describe housing-related indicators of material resources, are frequently used (18). Other indicators than education, occupational class and income are seldom used in Norway (19). Different indicators have different strengths and limitations; although in nutritional research, education is the most frequently used indicator (20).

Various social characteristics have been used in literature in addition to the social inequality indicators to examine socio-economical differences in nutritional behaviour. Maternal smoking, crowded living, marital status and maternal age are some of these factors (21;22).

2.2 Social inequalities in nutrition

A social gradient is seen in dietary quality and may contribute to inequalities in health. In several countries people on low incomes substitute fresh food with cheaper processed foods, and they are least able to eat well (23). A review of socioeconomic differences in food habits in Europe, found both education and occupational class to be related to consumption of fruits and vegetables (24). Those defined as having high socioeconomic status (SES) consumed more fruits and vegetables compared to Europeans with low SES.

Research in a Norwegian adult population has given similar results; a healthy diet is associated with higher social status (25). Inadequate diets of the low socioeconomic groups have also been reported elsewhere (26;27).

Both Norwegian and British researchers have found that children of higher socioeconomic status (SES) were more likely to eat healthy foods, more fruits and vegetables and less convenience foods and snacks than children of lower SES (28;29).

In the Avon Longitudinal Study, pre-school children of more highly educated mothers consumed a diet that conformed more closely to current dietary guidelines

on healthy eating when compared to children having less educated mothers (30). Dietary differences with lower intakes of vitamins, minerals and healthy foods, may contribute to the excess of ill health observed in children of less-educated mothers (30).

2.3 Infants and social inequalities in nutrition

Poor circumstances and inadequate nutrition conditions during pregnancy can lead to non-optimal fetal development (23). Poor fetal development is strongly associated with individual health parameters both with regard to short and long term consequences, and observational research studies show that the foundation of adult health is laid in early childhood and before birth (31-34). The “Fetal origins” hypothesis claims that the fetal environment, including nutritional conditions, gives rise to changes in the fetus' future life in a manner that may increase or decrease the susceptibility to diseases like type 2 diabetes mellitus, high blood pressure and coronary artery disease in adult life (35-37).

Infancy and childhood is characterized by rapid growth and development, and an adequate diet during this period is of great importance for the child's health condition (38). Eating habits and taste preferences evolves already in early years (39). Thus to establish good food habits and proper food selections at an early age is fundamental, and may be crucial for future health.

Growth- and nutritional conditions in early childhood may also influence the degree of morbidity and mortality later in life (40). Because of social inequalities not all children have the same opportunities for good health (6). With regard to this and the nutritional influence on the development of disease, it is interesting to investigate the associations between social group differences in infancy and the following nutritional behaviours:

2.3.1 Breastfeeding

Breast milk is the optimal nutrition for an infant (41). It provides nutrients in a well-balanced supply and amounts are adjusted to the child's needs. The milk contains a

multitude of components like immunological and bioactive compounds that promotes health and growth. Research in industrialized countries has shown the protective effects of breastfeeding with regard to diarrhoea, otitis media and upper air-way infection including shorter duration of disease (42-45). It may also be protective against the development of several chronic diseases like insulin-dependent diabetes mellitus (46), inflammatory bowel diseases (47;48) and atopy (49). A meta-analysis indicated that breastfeeding was associated with significantly higher scores for cognitive development than formula feeding (50). Initial breastfeeding has also been reported to protect against obesity later in life (51-53). Other research has found long-term breastfeeding to be associated with fewer hyperactivity symptoms at age 4 and that the fatty-acids in the breast milk and the psychological contact between mother and child may protect against the development of ADHD (54).

The World Health Organization (WHO) developed new recommendations on infant nutrition valid from May 2001; the duration of exclusive breastfeeding is prolonged from 4-6 months until 6 months with a subsequent gradual introduction to new food items (55). A WHO working group concluded that exclusively breastfed children with normal growth have no need for complementary feeding until six months of age. At this age the need for energy and vitamins, minerals and trace elements necessitates the introduction to other food items. The Norwegian infant feeding recommendations from 2001 follow the WHO's conclusion and final advice (56).

The first Norwegian survey on infant's nutrition, Spedkost 1998, found significant positive trends for the association between factors such as maternal education level, maternal age, number of childbirths and degree of urbanization, and exclusive breastfeeding at 4 months and breastfeeding at 6 months (57).

In Iceland exclusive breastfeeding at 1 month and at 4 months was less frequent among mothers having low education compared with those in the highest education group (58).

Results from the Millennium Cohort Study in the U.K. revealed social inequalities with regard to initiation of breastfeeding; 93 per cent of the mothers in higher

managerial or professional occupations initiated breastfeeding compared to 53 per cent in routine occupations (59). In the Netherlands, the same positive association was found between breastfeeding initiation and higher educated mothers, higher educated partners and having a full time job (60). Analysis of The Longitudinal Study of Child Development in Quebec (LSCDQ) indicates that adherence to the recommendations with regards to breastfeeding initiation, duration and exclusivity is higher when living in families with the highest socioeconomic status (22). Researcher in Sweden, Germany and the United States have presented similar results (21;61;62).

2.3.2 Formula and additional fluids

Because of the recommended exclusive breastfeeding, infants should not receive any additional fluids to breast milk before the age of six months (56). Formula feeding is recommended if breastfeeding is not possible or if extra nutrition in addition to breast milk is needed (56). However, it is of great importance to recognize the lack of immunological and bioactive compounds in formula milk.

An Italian study examined the relationship between maternal education and feeding children with formula (63). The rate of formula feeding was significantly increased in 3 months old infants born of mothers with a low level of education; the opposite was seen in the high educational group. In the LSCDQ study in Quebec an inverse association was found between drinking formula and increasing maternal educational level, increasing maternal age and having a two-parent family (22).

Hendricks et al. found meeting recommendations for juice consumption to be positively associated with having a college education (62).

2.3.3 Introduction to semi-solid and solid foods

From six months of age semi-solid and solid foods are recommended to be introduced gradually as a supplement to breast milk. This to meet the child's demand for energy and nutrients (56). It is of importance with regard to a possibly reduced risk of developing celiac disease that gluten-containing food items are introduced

while the child is still breastfed (64). Mothers ought to continue breastfeeding their child until the age of 12 months and solid foods and gluten should be introduced carefully from the age of 6 months (56). The first Spedkost survey was based on the recommendation that solid foods were to be introduced at 4-6 months of age (57). Increasing odds for following the recommendations was found with the mother's increasing age, higher education and the more crowded place of residence.

An American study found that appropriate timing of introducing complementary foods (4-6 months) was positively associated with maternal college education compared to those less educated (62).

2.3.4 Sugar-sweetened drinks

Sugar provides energy. However, it does not supply nutrients like vitamins, minerals and trace elements. The requirement of these nutrients is high compared to an infant's need of energy. A diet containing much added sugar may lead to low supply of micronutrients since more nutrient dense food items are displaced. Because of this and when considering dental health, eating and drinking food items with a high added sugar content like soft drinks, nectars and squash, sweets, cookies and sweet biscuits ought to be avoided for infants and small children (56).

Because of the recommended exclusive breastfeeding of 6 months duration, no recommendation of the diet's sugar content exists for infants at younger ages. But from the age of 6 months the intake of added sugar should be limited to 10 energy per cent (65). Introduction of refined sugars into the diet may lead to pronounced increase in dental caries, and comparisons between countries with highly deviating sugar intake display a strong association between average sugar intake and caries prevalence (66). Studies have shown caries prevalence to be socioeconomically distributed, where the socially disadvantaged have the highest prevalence (67;68). Literature has shown consumption of sugar-sweetened drinks to be associated with obesity in childhood (69).

Icelandic research has documented that infants of mothers having less than 11 years of education consumed significantly more sugar than those having mothers with

more than 13 years of education (58) . A positive association between an infant's intake of added sugar and maternal smoking was also revealed. Spedkost 1998 found similar results (57).

2.3.5 Vitamin D and supplements

Vitamin D is essential for the structure and maintenance of the skeleton, for normal absorption of calcium, the regulation of serum calcium and for calcium reabsorption in the kidneys (56).

A newborn child's storage of vitamin D depends on the vitamin D status of the mother (65). During the first six weeks of life there is a rapid decline of plasma concentration of 25-hydroxy vitamin D to a level seen in rickets (70). Human milk does not contain enough vitamin D to prevent rickets even if the mother takes vitamin D supplements (71). Breast milk contains approximately 0.6-1.3 µg vitamin D-metabolites per liter (72). An exclusively breastfed infant would then receive no more than 1 µg vitamin D per day from 750 ml breast milk. The same volume with infant formula gives around 7.5 µg per day (56).

At northern latitudes, the sun exposure does not provide enough vitamin D and supplementation is necessary (65) to promote growth and optimal development of the infant's skeleton.

Recommended daily intake of vitamin D is 10 µg per day until the age of 23 months (56). Every infant should receive vitamin D supplements from 4 weeks of age. In Norway it is recommended that supplements of vitamin D come from cod liver oil. A gradual introduction starting at 2.5 ml and ending at 5 ml when the infant is 6 months is recommended, and from 6 months the infant should receive continued supplementation of 5 ml. Those who do not receive cod liver oil should be provided with vitamin D drops.

Lande et al. found the intake of cod liver oil to be positively associated with increasing maternal age and education (57). Gudnadottir et al. showed a difference in the frequency of intake of the recommended cod liver oil or AD vitamin drops

according to mother's age; the older age group provided vitamin D supplementation more often than the younger (58).

2.4 The Spedkost survey and social inequalities

“The Gradient Challenge” published by Directorate of Health, Norway, states that knowledge is especially needed on how conditions in childhood and adolescence influence social health differences (73). In light of this and the importance of nutritional interventions among infants for a good development of future health (38), it is of great value to examine the potential existence of social inequalities in diet among Norwegian infants.

The results presented in this thesis are the first analyses of social inequalities in the national dietary survey among 6 months old infants conducted in 2006 (Spedkost 2006).

3. Study aim and Research questions

3.1 Study aim

The main goal is to examine if there are social inequalities and/or differences in social characteristics in infant feeding practices among six months old infants from the survey Spedkost 2006.

3.2 Scientific research questions

- Are there social inequalities and/or differences in social characteristics regarding breastfeeding and exclusive breastfeeding at 1 week, 4 weeks, 4 months and 6 months of age?
- Are there social inequalities regarding when mothers end breastfeeding?
- Are there social inequalities and/or differences in social characteristics regarding introduction to semi solid and solid foods?
- Are there social inequalities and/or differences in social characteristics regarding the use of sugar-sweetened drinks?
- Are there social inequalities regarding juice-, water- and formula consumption?
- Are there social inequalities and/or differences in social characteristics regarding the use of vitamin D supplementation?

4. Subjects and Methods

4.1 Subjects

The analyses were performed on the data from the Spedkost 2006 survey conducted in Norway. The survey is a part of the national food surveillance system. Statistics Norway (SSB) established a nation-wide sample of 3000 mothers of 6 months old children. The sample included all children born during the period from 17.04.2006 to 08.05.2006 having mothers of Norwegian or another Scandinavian origin. Non-Scandinavian mothers were not included in the study. According to Statistics Norway, approximately 10 per cent of children born in 2006 had mothers with non-Scandinavian citizenship (74).

If the mother had given birth to twins or triplets, only the first-born child was included in the survey.

It was assumed that the diet of a child born in April-May does not differ significantly from the diets of children having birthdays in other seasons.

Based on the infants' birth dates, Statistics Norway established the sample and provided information on the geographical region and number of inhabitants of mother/child's residence.

Some of the respondents' addresses were incorrect; the final sample was thus 2977 invited persons. A total of 85 respondents did not consent for participation. Returned questionnaires were received from 1986 who agreed to participate; 1686 by mail, and 300 electronically. This gave a participation rate of 66%.

4.2 Design

The data collection was carried out during November 2006. An invitation letter from the University of Oslo together with a semi-quantitative food frequency questionnaire (SFFQ) (appendix 1) was delivered to the mother by mail 2 weeks before the infant turned 6 months. One of the parents or both should fill in the SFFQ as close to the infants' 6 months day as possible. Together with the SFFQ there was a description of how to fill in the questionnaire electronically. To obtain data on the child's weight and length, parents were asked to bring the questionnaire to the regular 6 months check-up at the local child health care centre. The completed questionnaire was supposed to be returned in a pre-paid envelope, or by web. The invited participants who had not returned the SFFQs received a "thank-you" and a reminder letter 2 weeks after the first mail-delivery. A second request together with a questionnaire was sent after another 2-3 weeks. Those who had not filled in information on weight and length were requested for this information in a separate letter.

In advance of the survey, all local health centers in Norway were informed about Spedkost. The health care centers received the SFFQs and a poster that was going to be placed in the health care center as a reminder when parents visited for infant's check-ups.

All participants were part of a lottery. Ten persons won 10.000 NOK and another ten persons won 5.000 NOK.

Data were collected in such a way that participants remained anonymous.

4.2.1 Ethical considerations

The study was reported to the Norwegian Social Science Data Services and was approved by the Regional Ethics Committee for Medical Research (appendix 2). Informed consent was obtained from the parents.

4.3 Methods

4.3.1 Semi-quantitative food frequency questionnaire

A self-administered semi-quantitative food frequency questionnaire (SFFQ) was used to examine the diet of 6 months old infants. This questionnaire was based on the questionnaire used in the first Spedkost survey (Spedkost 6 months 1998). A revised version of the 1998-questionnaire was prepared before conducting a 130 participant's pilot study which resulted in only minor corrections. The new SFFQ was updated with regard to food products, more questions about food items, and a question on when the infant was introduced to water. It also included a reorganization of the frequency categorization.

In the SFFQ the infant's habitual diet was to be described. Because of dietary variation, when filling in the questionnaires, parents were asked to indicate an average diet and consider the last two weeks' diet as a reference (75).

The questionnaire has 14 pages and includes 2 pictures of portion sizes, 4 different bottle sizes of milk and six of porridge, and it contains 42 questions. The SFFQ covers the following themes:

- Approval statement/informed consent
- Weight and length at birth and at 6 months of age
- Questions about the baby (gender, gestational age, number of siblings)
- Questions on the diet (breastfeeding, formula/other milk, solid foods, other liquids and food items avoided)
- Questions on vitamin-mineral supplements
- Questions on infant nutrition information
- Questions about the mother and the father (maternal age, maternal and paternal educational level, mother's working situation before delivery, marital status, maternal smoking habits and allergy/asthma in the family)

The SFFQ was designed to reveal data on the infant's diet at 6 months and in the period from birth until 6 months. Questions on breastfeeding were related to whether

or not the babies were breastfed, other types of drinks consumed, when ending breastfeeding in weeks from 1 to 7 weeks and in half months from 2 until 6 months, mother's reason for ending breastfeeding and the frequency of breastfeeding at 6 months separated into 6 categories from 1 to 10 times or more per 24 hours. Further questions were on what other types of milk consumed, including the frequency, whether or not the baby was introduced to semi solid or solid foods before 6 months, the frequency of eating this per 24 hours and infant age when introduced (in weeks or months). The food items asked for were different types of porridge: industrial and homemade, dinners both industrial and homemade, fruit and berries and ecological foods.

For each drink and food item it was reported how often the infant received the foods or drinks as frequencies per 24 hours or weeks. The frequencies were divided from never/less than every week till 5 or more per 24 hours.

When several alternatives were included in one category, the category average was used in the analysis, e.g. "having porridge 1-3 times a week", was coded as 2 times a week.

More than 50 different food and drink items were covered. The questions also asked at what age the child was introduced to selected items.

Since amounts only were recorded for limited food items, energy and nutrient intake were not calculated.

4.3.2 Control of filled in SFFQs

Food items were regarded as not used when neither frequency nor amount was filled in or if "not had/never/less than weekly" was filled in.

Double marks for frequencies or amount consumed were corrected to the lower alternative.

When frequency was filled in but not amount, the lowest portion size was used.

Double marks for age when ending breastfeeding were corrected to the higher alternative when double marks were next to each other. With an open alternative between, the marks were corrected to the open alternative, and with two open alternatives, the double marks were removed and registered with the identification number, as was the regular procedure for double marks.

When more than one mark for age when introduced to a food item were filled in, the lower mark was used, with an open alternative between; age was corrected to the open alternative, with two open alternatives, the double marks were removed.

Double marks for education were corrected to the higher mark.

None of the questionnaires were excluded.

The data file was checked for possible wrong numbers concerning maternal age, infant weight and length at birth and at 6 months. If the numbers seemed unlikely, they were checked by looking at the original SFFQ resulting in six identities not being included in the infant anthropometric and maternal age analyses.

4.4 Data analyses and statistics

The paper version of the questionnaire was scanned by Teleform software version 8.0. Electronical SFFQs were directly imported to the SPSS package (14.0); the program used for statistical analyses.

Descriptions of anthropometric values of infants in addition to characteristics of the infant, mother and father including selected demographic values are given as means with standard deviation and proportions in per cent. The Kolmogorov-Smirnov-Test-of-Normality and histograms were used to test for normality of the variables.

Differences between groups are tested with one-way ANOVA analysis with Bonferroni correction since all tested groups were normally distributed. Analyses of differences in proportions between groups were tested by Chi-square trend test (linear-by-linear association).

Missing data on maternal and paternal education were only 1 and 2 per cent respectively. The non-categorized/missing data were not considered to represent any specific group, and exclusion was evaluated not to influence the results (data not shown).

4.4.1 Multivariate analysis

Multiple logistic regression analyses were used to examine the relationship between the infants' different feeding practices of interest and seven socially connected variables.

Dependent variables were:

- Exclusive breastfeeding at ages: 1 week, 4 weeks, 4 months and 6 months.
- Breastfeeding at ages: 1 week, 4 weeks, 4 months and 6 months
- The use of other food items at the age of 6 months: no daily or weekly use of sugar-sweetened drinks, consumption of solid, semi-solid or soft foods, and the use of vitamin D supplements.

Definitions of feeding variables

Breastfeeding was in the data analyses classified into two groups, and the definitions are according to WHO (76):

- Exclusively breastfed infants only received breast milk (including expressed breast milk or breast milk from a wet nurse), no water or water-based drinks, no formula or other types of milk, no solid foods, but allows the infant to receive ORS (oral rehydration solution), drops and syrups (vitamin-mineral supplements, medicines).
- Breastfeeding included all breastfed children, whether or not they received formula, other types of milk, water, juice or solid foods and possibly vitamin-mineral supplements.

Sugar-sweetened drinks include squash ("saft") and nectar.

All the dependent variables were recategorized into dichotome variables and divided according to presence or absence of the infant nutrition practice.

As indicators for social inequalities, maternal and paternal education level was used since no other indicators for socioeconomic position were available in the Spedkost material. When measuring differences concerning social characteristics, five other variables were used because they are socially distributed.

The independent variables presented are:

- Maternal education divided into three levels: ≤ 10 years, 11-12 years, and ≥ 13 years
- Paternal educational level in three: ≤ 10 years, 11-12 years, and ≥ 13 years
- Maternal age presented in three categories: < 25 years, 25-34 years, > 34 years
- Maternal marital status distinguished between married/cohabitant or not married/cohabitant
- Maternal working situation before giving birth: working either full-time or part-time in one category and not working in the other
- Degree of urbanization classified as: < 2000 inhabitants, 2000-19999 inhabitants, 20000-99999 inhabitants, and ≥ 100000 inhabitants
- Maternal smoking habits at infant age of 6 months: yes or no

All these variables have been recategorized from their original categories. Age was originally a continuous variable, education was divided into eight categories, working situation was separated into ten categories and marital status consisted of four categories. Regarding the degree of urbanization-variable, the original five categories were collapsed into four.

The highest completed education was measured and used to categorize educational level. Generally, the different categories were chosen using Spedkost 1998 as a reference to be able to compare the two studies. The educational categories are here representing milestones in the educational process, with low education representing elementary school, medium education represents high school and high education is any kind of education on university or college level.

Infant gender, infant birth weight and maternal smoking at the infant's age of 6 months are biologically relevant to both exclusive breastfeeding and breastfeeding. These variables are always included in the multivariate models even if significant or not. Infant

birth weight was in the SFFQ originally presented as a continuous variable. However, in the analyses the birth weights were collapsed into three categories: <2500 g, 2500-3500 g, >3500 g. Gender distinguished between boys and girls.

If found significant, the number of maternal deliveries was adjusted for in the multivariate model.

The independent variables were tested for correlation using Cramer's V for testing correlation between two variables that are both categorical and nominal; all the examined variables had a level of association less than 0.35, so there should be no concern to include all of them in the same model (77).

The regression analyses were performed using Hosmer's method for developing a good model (78). Analyses were done by first examining the independent effect of each social inequality or social characteristic on the various infant feeding practices. We used both the univariate analyses with a lax criterion of $p < 0.25$ (78) and variables being significant in literature to decide which variables to examine in the multivariate analyses.

Variables that were not significant in the multivariate model, but potentially relevant, were tested if they were to be included in the model using the log likelihood test. If an exclusion of these variables from the model resulted in another model not significantly different from the former, the excluded variable was considered not relevant for the current dependent variable and thus not included in the final model. The final multivariate models were developed after several such considerations.

The results are presented as crude and adjusted odds ratios (OR) with a 95% confidence interval (CI). Multiplying the relevant variables and including this product into the final model were done for assessment of potential interaction effects. Tests for trends across categories were performed by treating the categories as continuous variables.

All p-values are two-sided, and a p-value less than 0.05 was considered statistically significant.

The Hosmer-Lemeshow-test was used to assess how well the models predict the various dependent variables.

Complete data on all the social characteristics were available for 1667 subjects. This represents 84% of the sample and 56 % of those originally invited. Both in the analyses for crude and adjusted odds ratios only the persons answering all variables of interest were included. This was done to avoid differences in crude and adjusted ORs only because of inequality in numbers between the univariate and multivariate analysis.

5. Results

5.1 Characteristics of the study population

Selected infant, maternal and paternal characteristics are presented in Table 1. The infant characteristics did not differ from the general Norwegian 6 months old infant population where national data is available. Feeding practices in the Spedkost sample of 6 months old infants showed that 80 per cent of the infants were still receiving breast milk. The same percentage received some sort of vitamin D supplements, and 2 per cent were daily or weekly consumers of sugar-sweetened drinks. Regarding the new WHO-recommendations, 9 per cent of the infants were exclusively breastfed at 6 months of age and 88 per cent were introduced to solid foods at the same age.

In the present study, the maternal characteristics were different from the Norwegian population, the mothers in our study had a mean age of 30.8 years, and the national mean maternal age is slightly younger, 30.2 years. With regard to education, our sample is different from the educational level in Norway; in Spedkost mothers with 13 years or more of education represented 63 per cent of the population, among the Norwegian female population aged 20-39 the same proportion is 42 per cent. Only 5 per cent of the Spedkost population is in the lowest education group, in Norway 19 per cent belongs to this education category. The Spedkost sample is more similar to Norwegian women when comparing maternal working situation before giving birth, 82 per cent of Norwegian women is working fulltime or part-time, in the Spedkost population 84 per cent were working before giving birth. A few more in our sample are married or cohabitant, 96 per cent versus 93 per cent nationally. Examination of paternal education also shows our sample to have more educated fathers than the general Norwegian male population.

The comparisons between the Spedkost study sample and the Norwegian population have not been tested statistically.

Table 1. Selected infant, maternal and paternal characteristics from the Spedkost survey compared to data on the general Norwegian infant, female and male population where that is available.

Characteristics	Spedkost 2006		Norway ¹	
	n	Value ²	N	Value ²
Infant				
Boys (%)	1980	50	56256	51
Birth weight (g)	1980	3585 (589)	56256	3492 (640)
Birth length (cm)	1964	50.3 (2.7)	-	-
Weight at 6 months (g)	1967	8076 (994)	-	-
Length at 6 months (cm)	1960	68.3 (2.7)	-	-
Birth weight (%)				
<2500 g	74	4	-	5
2500-3500 g	736	37	-	41
>3500 g	1170	59	-	53
Infant feeding practices at 6 months				
Exclusively breastfed (%)	1986	9	-	-
Breastfed (%)	1986	80	-	-
Introduced to solid foods (%)	1986	88	-	-
Receiving vitamin D supplementation (%)	1986	80	-	-
Not receiving sugar-sweetened drinks (%)	1984	2	-	-
Mother				
Age (years)	1952	30.8 (4.7)	-	30.2
Age (%)				
<25 y	201	10	-	16
25-34 y	1334	68	-	65
>34 y	416	21	-	19
Educational level (%)			1905704	
≤10 y	104	5	-	19 ³
11-12 y	594	30	-	39 ³
≥13 y	1245	63	-	42 ³
Not categorized/missing	19	1	-	-
Number of childbirths (%)				
1 child	802	41	-	42
2 children	790	40	-	36
3 or more children	385	19	-	23
Smoking at 6 months (%)	1933	15	-	-
Married/cohabitant (%)	1967	96	-	93
Working (fulltime/part-time) before giving birth (%)	1919	84	-	82 ⁴
Degree of urbanization (%)				
<2000 inhabitants	558	29	-	-
2000-19999 inhabitants	457	24	-	-
20000-99999 inhabitants	273	14	-	-
≥100000 inhabitants	610	32	-	-
Father				
Educational level (%)			1860801	-
≤10 y	159	8	-	24 ⁵
11-12 y	868	44	-	47 ⁵
≥13 y	876	44	-	28 ⁵
Not categorized/missing	30	2	-	-

¹Spedkost 6 months - report 04.2008. Directorate of Health.

²Per cent for categorical variables, mean (SD) for continuous variables.

³Statistics Norway (SSB), sources available at Internet – <http://www.ssb.no/utniv/tab-2008-08-21-03.html> - Mean for 2007. Women aged 20-39 years.

⁴Statistics Norway (SSB), sources available at Internet - <http://www.ssb.no/aarbok/tab/tab-209.html> - Mean for 2007. Women aged 20-39 years.

⁵Statistics Norway (SSB), sources available at Internet – <http://www.ssb.no/utniv/tab-2008-08-21-03.html> - Mean for 2007. Men aged 20-49 years.

- no values available.

Table 2 shows that there were no significant differences in infant anthropometric values between the three maternal educational groups. There were also no significant differences in infant anthropometrical values in the different paternal educational levels (data not shown) and the pattern was similar to results for maternal education.

Table 2. Infant anthropometric values; mean (standard deviation) [min, max] related to maternal educational level (n=1986).

Infant Characteristics	MOTHERS EDUCATIONAL LEVEL (years)			p-value ¹	Missing
	≤ 10 (n=104)	11-12 (n=594)	≥13 (n=1245)		
Birth weight (g)	Mean (SD) [min, max] 3566 (489) [2480, 4960]	Mean (SD) [min, max] 3578 (629) [575, 5974]	Mean (SD) [min, max] 3593 (584) [430, 5420]	n.s. ²	49
Birth length (cm)	50.1 (2.7) [32, 57]	50.2 (2.9) [32, 62]	50.4 (2.6) [28, 57]	n.s.	63
Weight at 6 months (g)	8262 (1044) [6095, 11850]	8054 (1012) [4250, 11680]	8081 (980) [3370, 11465]	n.s.	62
Length at 6 months (cm)	68.2 (2.3) [62, 74]	68.1 (2.8) [55, 79]	68.3 (2.7) [52, 77]	n.s.	69

¹Analysed by one-way ANOVA analysis.

²n.s. = not significant differences between the educational groups.

When examining maternal characteristics according to maternal educational level, significant differences were found with regard to smoking at infant age of 6 months, whether the mother was married/cohabitant or single parent, her working situation before giving birth, maternal age and degree of urbanization. The most educated mothers smoked less, more were married/cohabitant, working before giving birth, they were older and lived in more urbanized areas (Table 3).

Table 3. Selected maternal characteristics related to maternal educational level. Numbers (%) within each variable in the different educational groups.

MOTHERS EDUCATIONAL LEVEL (years)	Smoking at 6 months	Married/ Cohabitant	Working before giving birth	Age > 30 y	Degree of urbanization > 20000 inhabitants
≤10 (n=104)	46 (45)	90 (87)	65 (64)	41 (39)	23 (23)
11-12 (n=594)	136 (23)	559 (94)	452 (79)	224 (38)	209 (37)
≥13 (n=1245)	111 (9)	1211 (97)	1087 (89)	749 (61)	633 (53)
p-value ¹	<0.001	<0.001	<0.001	<0.001	<0.001
Total n (missing)	1986 (95)	1986 (43)	1986 (91)	1986 (35)	1986 (88)

¹ Significant linear trends within each maternal characteristic for increasing educational level. Analysed by Chi-square trend test.

5.2 Total breastfeeding

5.2.1 Exclusive breastfeeding

Figure 3 shows that the age decline in exclusive breastfeeding is pronounced when looking at all infants, although at the age of 4 weeks, 82 per cent is exclusively breastfed, 46 and 9 per cent is exclusively breastfed at 4 and 6 months respectively. Inequalities in exclusive breastfeeding according to maternal educational level exist at all examined age groups, which are shown by significantly increasing linear trends in proportions being exclusively breastfed according to increasing maternal educational level.

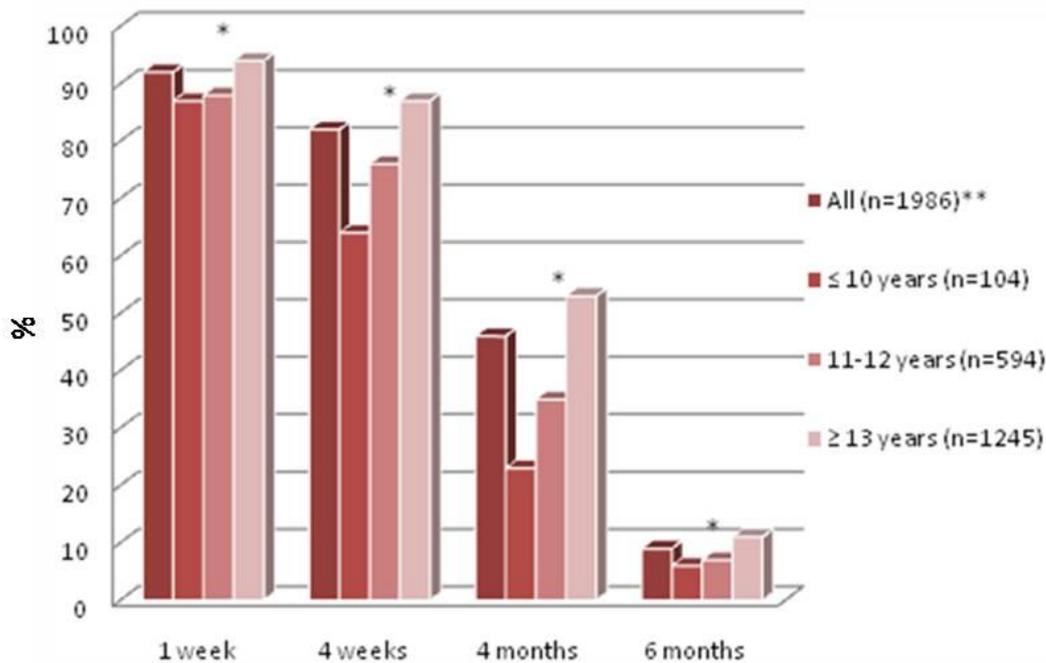


Figure 3. Exclusively breastfed infants in percentages according to maternal educational level.

* Significant linear trends in proportions being exclusively breastfed according to increasing educational level within each infant age group, analysed by Chi-square trend test. p -value <0.001 , except for 6 months=0.01.

**Missing =43.

5.2.2 Breastfeeding

Ninety-five per cent of all infants are breastfed for the first 4 weeks. When the children are 6 months, almost 80 per cent are still breastfed. However, there are inequalities by maternal educational level in breastfeeding at almost every examined

infant age group. At 6 months the difference in percentages being breastfed between the highest and lowest education group is more than 30 per cent (Figure 4).

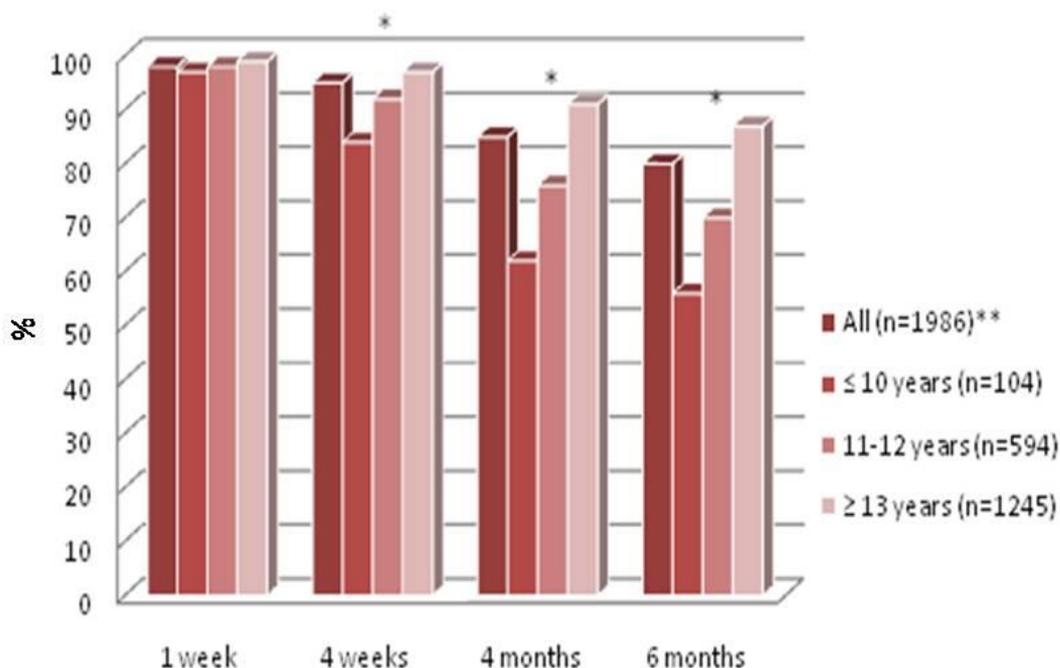


Figure 4. Breastfed infants in percentages according to maternal educational level.

* Significant linear trends in proportions being breastfed according to increasing educational level within each infant age group, analysed by Chi-square trend test. p -value<0.001.

**Missing=43.

Among those infants no longer breastfed at 6 months of age, which concerns 372 infants, the mean age for ending breastfeeding, was significantly lower among those in the lowest educational group; the mean age was 9 weeks compared to 14 weeks in the highest educational group (p <0.001) (Table 4).

Table 4. Infants age (weeks) when ending breastfeeding among those not breastfed at the age of 6 months related to maternal educational level (n=372).

MOTHERS EDUCATION LEVEL (years)	Age when ending breastfeeding
	Mean (weeks) (SD)
≤ 10 (n=44)	9 (7)
11-12 (n=172)	12 (7)
≥13 (n=156)	14 (8)
<i>p</i>-value¹	<0.001

¹Analysed by one-way ANOVA analysis.

If breastfeeding was ended, mothers were asked to fill in the reason for giving up breastfeeding. The two most frequent reasons were “Too little breast milk” (39%) and “Infant did not want to” (16 %) (data not shown). Analysis of reasons according to mother’s educational level resulted in no significant differences between the educational groups.

5.2.3 Formula and additional fluids

Differences between proportions using water were tested among the infants, and a significantly decreasing linear trend for consumption was found for increasing maternal educational level (Figure 5). Among mothers with 10 years or less at school, almost 20 per cent more of the infants were served water compared to those with the longest education. The same tendency is seen when comparing the use of formula milk and sugar-sweetened drinks in the different educational groups. None of the children were using carbonated soft drinks (data not shown).

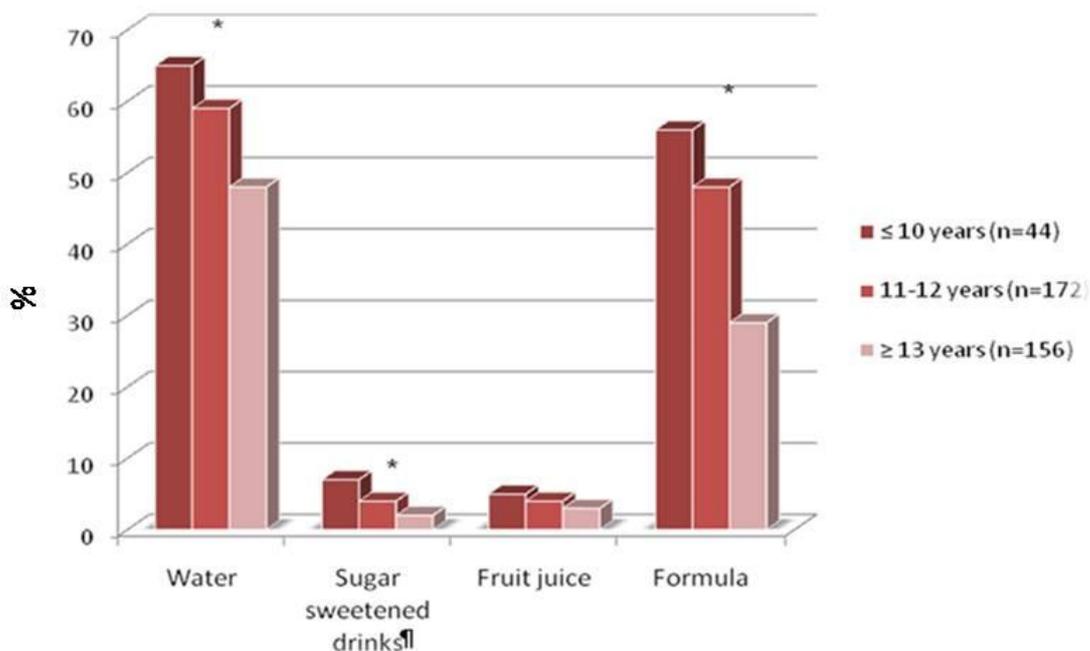


Figure 5. Proportions of infants receiving formula and additional fluids according to maternal educational level (n=1986¹).

¹Missing=43.

*Significant linear trends in proportions drinking formula or additional fluids according to increasing educational level analysed by Chi-square trend test. p-value<0.001.

¶ Sugar-sweetened drinks include nectar and squash (“saft”).

5.3 Influence of social inequalities and characteristics on infant feeding

5.3.1 Exclusive breastfeeding

The results from the logistic regression analyses show social inequalities and differences in social characteristics in exclusive breastfeeding. At one week only increasing maternal education is positively associated with exclusive breastfeeding (Table 5).

When performing univariate analyses, parental education and all the social characteristics except for maternal age at 4 weeks, are significantly associated with exclusive breastfeeding at 4 weeks and 4 months (Table 6-7).

Adjusted ORs for exclusive breastfeeding at 4 weeks increase with maternal education and are negatively associated with mother smoking and being a single parent (Table 6).

Exclusive breastfeeding at 4 months is the one dependent variable that is associated with the most social variables. Table 7 shows that maternal and paternal education, maternal age and degree of urbanization all gave significant positive linear trends. The odds for exclusive breastfeeding were more than doubled for mothers older than 34 years compared to those younger than 25 years of age ($p=0.01$). The same result is seen when comparing the highest and the lowest maternal educational group; a more than doubled odds ratio for exclusive breastfeeding among those with the longest education. Infants of non-smoking mothers were almost 3 times more likely to be exclusively breastfed.

An interaction effect was found between paternal education and infant birth weight regarding exclusive breastfeeding at 4 months. When stratifying on infant birth weight, increasing paternal education was only significantly associated with being exclusively breastfed at 4 months when the infant had a birth weight between 2500 and 3500 g.

When examining the relationship between being exclusively breastfed at 6 months, parental education and social characteristics, a positive association was found for high maternal age and mothers not smoking. Infants of non smoking mothers had a 300 % increased odds for being exclusively breastfed compared to those having smoking mothers (Table 8).

Table 5. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of exclusive breastfeeding at 1 week of age according to social inequalities and characteristics (n=1686).

	N*	n§	Exclusive breastfeeding – 1 week			
			Crude		Adjusted ¹	
			OR	(95 % CI)	OR	(95 % CI)
Mother's education level (years)						
≤10	86	75	1.00		1.00	
11-12	496	434	1.03	(0.52, 2.04)	0.97	(0.48, 1.94)
≥13	1104	1041	2.42	(1.23, 4.79)	2.18	(1.07, 4.42)
<i>p for trend</i>			<0.001		<0.001	
Father's education level (years)						
≤10	134	119	1.00		-	
11-12	757	683	1.16	(0.65, 2.10)		
≥13	795	748	2.01	(1.09, 3.70)		
<i>p for trend</i>			0.009			
Mother's age group (years)						
<25	153		-		-	
25-34	1164					
>34	369					
<i>p for trend</i>						
Mother's employment status before giving birth						
Working	1428		-		-	
Not working	258					
<i>p-value</i>						
Degree of urbanization (no. of inhabitants)						
<2000	488		-		-	
2000-19999	412					
20000-99999	243					
≥100000	543					
<i>p for trend</i>						
Maternal marital status						
Married /cohabitant	1627	1501	1.00		-	
Not married/cohabitant	59	49	0.41	(0.20, 0.83)		
<i>p-value</i>			0.01			
Maternal smoking at 6 months						
Smoking	252	221	1.00		1.00	
Not smoking	1434	1329	1.78	(1.16, 2.72)	1.36	(0.87, 2.14)
<i>p-value</i>			0.008		0.18	

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are exclusively breastfeeding at 1 week of age.

¹Adjusted for infant birth weight and infant gender, plus the other variable in the adjusted table.

- No significant association found for the variable in the analysis.

Table 6. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of exclusive breastfeeding at 4 weeks of age according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Exclusive breastfeeding – 4 weeks			
			Crude		Adjusted ¹	
			OR	(95 % CI)	OR	(95 % CI)
Mother's education level (years)						
≤10	86	56	1.00		1.00	
11-12	496	380	1.76	(1.08, 2.86)	1.50	(0.90, 2.49)
≥13	1104	957	3.49	(2.17, 5.62)	2.71	(1.63, 4.49)
<i>p for trend</i>			<0.001		<0.001	
Father's education level (years)						
≤10	134	98	1.00		-	
11-12	757	604	1.45	(0.95, 2.21)		
≥13	795	691	2.44	(1.58, 3.77)		
<i>p for trend</i>			<0.001			
Mother's age group (years)						
<25	153		-		-	
25-34	1164					
>34	369					
<i>p for trend</i>						
Mother's employment status						
Before giving birth						
Working	1428	1199	1.00		-	
Not working	258	194	0.58	(0.42, 0.79)		
<i>p-value</i>			0.001			
Degree of urbanization						
(no. of inhabitants)						
<2000	488	395	1.00		-	
2000-19999	412	336	1.04	(0.74, 1.46)		
20000-99999	243	192	0.89	(0.61, 1.30)		
≥100000	543	470	1.52	(1.09, 2.12)		
<i>p for trend</i>			0.03			
Maternal marital status						
Married /cohabitant	1627	1356	1.00		1.00	
Not married/cohabitant	59	37	0.34	(0.20, 0.58)	0.43	(0.25, 0.77)
<i>p-value</i>			<0.001		0.004	
Maternal smoking at 6 months						
Smoking	252	176	1.00		1.00	
Not smoking	1434	1217	2.42	(1.79, 3,29)	1.78	(1.28, 2.47)
<i>p-value</i>			<0.001		0.001	

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are exclusively breastfeeding at 4 weeks of age.

¹Adjusted for infant birth weight and infant gender, plus the other variables in the adjusted table.

- No significant association found for the variable in the analysis.

Table 7. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of exclusive breastfeeding at 4 months of age according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Exclusive breastfeeding – 4 months			
			Crude		Adjusted ¹	
			OR	(95 % CI)	OR	(95 % CI)
Mother's education level (years)						
≤10	86	21	1.00		1.00	
11-12	496	177	1.72	(1.02, 2.90)	1.40	(0.80, 2.45)
≥13	1104	594	3.61	(2.17, 5.98)	2.03	(1.15, 3.55)
<i>p for trend</i>			<0.001		0.003	
Father's education level (years)						
≤10	134	47	1.00		1.00	
11-12	757	295	1.18	(0.81, 1.74)	0.95	(0.62, 1.43)
≥13	795	450	2.41	(1.65, 3.54)	1.37	(0.89, 2.11)
<i>p for trend</i>			<0.001		0.008¶	
Mother's age group (years)						
<25	153	31	1.00		1.00	
25-34	1164	555	3.59	(2.38, 5.41)	1.91	(1.23, 2.99)
>34	369	206	4.97	(3.19, 7.76)	2.15	(1.30, 3.55)
<i>p for trend</i>			<0.001		0.01	
Mother's employment status						
Before giving birth						
Working	1428	689	1.00		-	
Not working	258	103	0.71	(0.54, 0.93)		
<i>p-value</i>			0.01			
Degree of urbanization (no. of inhabitants)						
<2000	488	198	1.00		1.00	
2000-19999	412	183	1.17	(0.90, 1.53)	1.07	(0.81, 1.42)
20000-99999	243	107	1.15	(0.84, 1.57)	0.96	(0.69, 1.34)
≥100000	543	304	1.86	(1.45, 2.39)	1.49	(1.12, 1.98)
<i>p for trend</i>			<0.001		0.01	
Maternal marital status						
Married /cohabitant	1627	778	1.00		-	
Not married/cohabitant	59	14	0.34	(0.19, 0.62)		
<i>p-value</i>			<0.001			
Maternal smoking at 6 months						
Smoking	252	57	1.00		1.00	
Not smoking	1434	735	3.60	(2.63, 4.92)	2.75	(1.97, 3.82)
<i>p-value</i>			<0.001		<0.001	

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are exclusively breastfeeding at 4 months of age.

¹Adjusted for infant birth weight, infant gender and number of childbirths, plus the other variables in the adjusted table.

¶An interaction effect was found between paternal education and infant birth weight, p=0.008. When stratifying on infant weight, increasing paternal education was only significantly associated with being exclusively breastfed when the infant had a birth weight between 2500 and 3500 g (p=0.001).

- No significant association found for the variable in the analysis.

Table 8. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of exclusive breastfeeding at 6 months of age according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Exclusive breastfeeding – 6 months	
			Crude OR (CI)	Adjusted ¹ OR (CI)
Mother's education level (years)				
<13	582	43	1.00	-
≥13	1104	118	1.50 (1.04, 2.16)	-
<i>p-value</i>			0.03	
Father's education level (years)				
<13	891		-	-
≥13	795			
<i>p-value</i>				
Mother's age group (years)				
<34	1317	110	1.00	1.00
>34	369	51	1.76 (1.24, 2.51)	1.66 (1.16, 2.37)
<i>p-value</i>			0.002	0.005
Mother's employment status before giving birth				
Working	1428		-	-
Not working	258			
<i>p-value</i>				
Degree of urbanization (no. of inhabitants)				
<2000	488		-	-
2000-19999	412			
20000-99999	243			
≥100000	543			
<i>p for trend</i>				
Maternal marital status				
Married /cohabitant	1627		-	-
Not married/cohabitant	59			
<i>p-value</i>				
Maternal smoking at 6 months				
Smoking	1434	9	1.00	1.00
Not smoking	252	152	3.20 (1.61, 6.36)	3.03 (1.52, 6.03)
<i>p-value</i>			0.001	0.002

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are exclusively breastfeeding at 6 months of age.

¹Adjusted for infant birth weight and infant gender, plus the other variable in the adjusted table.

- No significant association found for the variable in the analysis.

5.3.2 Breastfeeding

Social inequalities are also seen when examining infant breastfeeding. At infant age of 1 week breastfeeding is associated to maternal employment status before giving birth; infants of working mothers have higher odds for being breastfed (Table 9).

When performing univariate analysis, all the examined social variables are significant at 4 weeks, 4 and 6 months (Table 10-12).

In multivariate analysis; maternal educational level, working situation and smoking are significant at 4 weeks (Table 10), and at 4 and 6 months both maternal and paternal educational level is significantly related to breastfeeding, as well as maternal employment status and smoking (Table 11 and 12). Infants having mothers in the highest educational group are almost 3 and 2 times more likely of being breastfed at 4 and 6 months respectively.

Table 9. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of breastfeeding at 1 week of age according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Breastfeeding – 1 week	
			Crude OR (95 % CI)	Adjusted ¹ OR (95 % CI)
Mother's education level (years)				
≤10	86		-	-
11-12	496			
≥13	1104			
<i>p for trend</i>				
Father's education level (years)				
≤10	134		-	-
11-12	757			
≥13	795			
<i>p for trend</i>				
Mother's age group (years)				
<25	153		-	-
25-34	1164			
>34	369			
<i>p for trend</i>				
Mother's employment status				
Before giving birth				
Working	1428	1408	1.00	1.00
Not working	258	249	0.39 (0.18, 0.87)	0.41 (0.18, 0.92)
<i>p-value</i>			0.02	0.03
Degree of urbanization (no. of inhabitants)				
<2000	488		-	-
2000-19999	412			
20000-99999	243			
≥100000	543			
<i>p for trend</i>				
Maternal marital status				
Married /cohabitant	1627		-	-
Not married/cohabitant	59			
<i>p-value</i>				
Maternal smoking at 6 months				
Smoking	252	245	1.00	1.00
Not smoking	1434	1412	1.83 (0.78, 4.34)	1.70 (0.71, 4.06)
<i>p-value</i>			0.17	0.24

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are breastfeeding at 1 week of age.

¹Adjusted for infant birth weight and infant gender, plus the other variable in the adjusted table.

- No significant association found for the variable in the analysis.

Table 10. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of breastfeeding at 4 weeks of age according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Breastfeeding – 4 weeks			
			Crude OR	(95 % CI)	Adjusted ¹ OR	(95 % CI)
Mother's education level (years)						
≤10	86	70	1.00		1.00	
11-12	496	454	2.47	(1.32, 4.63)	1.93	(0.97, 3.81)
≥13	1104	1075	8.47	(4.40, 16.34)	5.62	(2.67, 11.82)
<i>p for trend</i>			<0.001		<0.001	
Father's education level (years)						
≤10	134	119	1.00		-	
11-12	757	706	1.75	(0.95, 3.20)		
≥13	795	774	4.65	(2.33, 9.26)		
<i>p for trend</i>			<0.001			
Mother's age group (years)						
<25	153	137	1.00		-	
25-34	1164	1109	2.36	(1.31, 4.22)		
>34	369	353	2.58	(1.25, 5.30)		
<i>p for trend</i>			0.01			
Mother's employment status before giving birth						
Working	1428	1373	1.00		1.00	
Not working	258	226	0.28	(0.18, 0.45)	0.36	(0.22, 0.59)
<i>p-value</i>			<0.001		<0.001	
Degree of urbanization (no. of inhabitants)						
<2000	488	456	1.00		-	
2000-19999	412	386	1.04	(0.61, 1.78)		
20000-99999	243	230	1.24	(0.64, 2.41)		
≥100000	543	527	2.31	(1.25, 4.27)		
<i>p for trend</i>			0.04			
Maternal marital status						
Married /cohabitant	1627	1548	1.00		-	
Not married/cohabitant	59	51	0.33	(0.15, 0.71)		
<i>p-value</i>			0.005			
Maternal smoking at 6 months						
Smoking	252	221	1.00		1.00	
Not smoking	1434	1378	3.45	(2.18, 5.47)	1.96	(1.17, 3.26)
<i>p-value</i>			<0.001		0.01	

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are breastfeeding at 4 weeks of age.

¹Adjusted for infant birth weight, infant gender and number of childbirths, plus the other variables in the adjusted table.

- No significant association found for the variable in the analysis.

Table 11. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of breastfeeding at 4 months of age according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Breastfeeding – 4 months			
			Crude		Adjusted ¹	
			OR	(95 % CI)	OR	(95 % CI)
Mother's education level (years)						
≤10	86	53	1.00		1.00	
11-12	496	380	2.04	(1.26, 3.30)	1.51	(0.88, 2.58)
≥13	1104	1006	6.39	(3.95, 10.35)	2.90	(1.65, 5.08)
<i>p for trend</i>			<0.001		<0.001	
Father's education level (years)						
≤10	134	100	1.00		1.00	
11-12	757	599	1.29	(0.84, 1.98)	0.93	(0.58, 1.50)
≥13	795	740	4.58	(2.84, 7.36)	2.18	(1.26, 3.77)
<i>p for trend</i>			<0.001		<0.001	
Mother's age group (years)						
<25	153	103	1.00		-	
25-34	1164	1013	3.26	(2.23, 4.76)		
>34	369	323	3.41	(2.16, 5.39)		
<i>p for trend</i>			<0.001			
Mother's employment status						
Before giving birth						
Working	1428	1242	1.00		1.00	
Not working	258	197	0.48	(0.35, 0.67)	0.64	(0.45, 0.92)
<i>p-value</i>			<0.001		0.02	
Degree of urbanization						
(no. of inhabitants)						
<2000	488	394	1.00		-	
2000-19999	412	342	1.17	(0.83, 1.64)		
20000-99999	243	206	1.33	(0.88, 2.01)		
≥100000	543	497	2.58	(1.77, 3.76)		
<i>p for trend</i>			<0.001			
Maternal marital status						
Married /cohabitant	1627	1400	1.00		-	
Not married/cohabitant	59	39	0.32	(0.18, 0.55)		
<i>p-value</i>			<0.001			
Maternal smoking at 6 months						
Smoking	252	157	1.00		1.00	
Not smoking	1434	1282	5.10	(3.76, 6.93)	3.35	(2.40, 4.67)
<i>p-value</i>			<0.001		<0.001	

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are breastfeeding at 4 months of age.

¹Adjusted for infant birth weight and infant gender, plus the other variables in the adjusted table.

- No significant association found for the variable in the analysis.

Table 12. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of breastfeeding at 6 months of age according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Breastfeeding – 6 months			
			Crude OR	Crude (95 % CI)	Adjusted ¹ OR	Adjusted ¹ (95 % CI)
Mother's education level (years)						
≤10	86	51	1.00		1.00	
11-12	496	348	1.68	(1.05, 2.69)	1.23	(0.73, 2.06)
≥13	1104	945	4.50	(2.83, 7.16)	2.18	(1.28, 3.72)
<i>p for trend</i>			<0.001		<0.001	
Father's education level (years)						
≤10	134	91	1.00		1.00	
11-12	757	553	1.33	(0.89, 1.98)	1.03	(0.66, 1.60)
≥13	795	700	3.62	(2.36, 5.55)	1.96	(1.21, 3.19)
<i>p for trend</i>			<0.001		<0.001	
Mother's age group (years)						
<25	153	94	1.00		-	
25-34	1164	942	2.71	(1.89, 3.89)		
>34	369	308	3.12	(2.03, 4.80)		
<i>p for trend</i>			<0.001			
Mother's employment status before giving birth						
Working	1428	1181	1.00		1.00	
Not working	258	180	0.48	(0.35, 0.65)	0.60	(0.43, 0.83)
<i>p-value</i>			<0.001		0.002	
Degree of urbanization (no. of inhabitants)						
<2000	488	369	1.00		-	
2000-19999	412	325	1.21	(0.88, 1.65)		
20000-99999	243	193	1.25	(0.86, 1.81)		
≥100000	543	474	2.22	(1.60, 3.07)		
<i>p for trend</i>			<0.001			
Maternal marital status						
Married /cohabitant	1627	1324	1.00		-	
Not married/cohabitant	59	37	0.39	(0.22, 0.66)		
<i>p-value</i>			0.001			
Maternal smoking at 6 months						
Smoking	252	144	1.00		1.00	
Not smoking	1434	1217	4.21	(3.15, 5.61)	2.95	(2.16, 4.04)
<i>p-value</i>			<0.001		<0.001	

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are breastfeeding at 6 months of age.

¹Adjusted for infant birth weight and infant gender, plus the other variables in the adjusted table.

- No significant association found for the variable in the analysis.

5.3.3 Introduction to solid foods

We found an association between being introduced to semi solid and solid foods upto the age of six months and maternal age and maternal smoking. The older the mother, the higher odds for timely introduction to solid foods ($p=0.001$) and infants having mothers not smoking give a more than 50 per cent reduced odds for weaning (Table 13).

Table 13. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of being introduced to semi solid and solid foods up to the age of 6 months according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Introduced to solid foods	
			Crude OR (95 % CI)	Adjusted ¹ OR (95 % CI)
Mother's education level (years)				
≤10	86		-	-
11-12	496			
≥13	1104			
<i>p for trend</i>				
Father's education level (years)				
≤10	153		-	-
11-12	1164			
≥13	369			
<i>p for trend</i>				
Mother's age group (years)				
<25	134	148	1.00	1.00
25-34	757	1032	0.26 (0.11, 0.66)	0.34 (0.14, 0.85)
>34	795	305	0.16 (0.06, 0.41)	0.22 (0.09, 0.56)
<i>p for trend</i>			<0.001	0.001
Mother's employment status				
Before giving birth				
Working	1428		-	-
Not working	258			
<i>p-value</i>				
Degree of urbanization (no. of inhabitants)				
<2000	488		-	-
2000-19999	412			
20000-99999	243			
≥100000	543			
<i>p for trend</i>				
Maternal marital status				
Married /cohabitant	1627		-	-
Not married/cohabitant	59			
<i>p-value</i>				
Maternal smoking at 6 months				
Smoking	252	240	1.00	1.00
Not smoking	1434	1245	0.33 (0.18, 0.60)	0.46 (0.25, 0.86)
<i>p-value</i>			<0.001	0.01

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are introduced to solid foods at 6 months of age.

¹Adjusted for infant birth weight, infant gender and breastfeeding at 6 months, plus the other variable in the adjusted table.

- No significant association found for the variable in the analysis.

When analyzing the infant age of when introduced to solid foods related to maternal education, there was a significant difference of three weeks ($p < 0.001$) between the group with education ≤ 10 years and those with education ≥ 13 years (Table 14).

Table 14. Infant age (weeks) when introduced to solid foods related to maternal educational level. Values are presented as means (standard deviations) ($n=1986^1$).

MOTHERS EDUCATIONAL LEVEL (years)	Introduced to solid foods
	Mean age in weeks (SD)
≤ 10 (n=98)	18 (4)
11-12 (n=530)	19 (4)
≥ 13 (n=1087)	21 (4)
<i>p-value</i> ²	< 0.001

¹Missing=43

²Analysed by one-way ANOVA analysis

5.3.4 Sugar-sweetened drinks

No daily or weekly use of sugar-sweetened drinks showed a social gradient, the more educated fathers, the higher odds for infants not receiving sweetened drinks. Infants of mothers working before delivery had a more than 60 per cent reduced risk for receiving sugar containing beverages (Table 15).

Table 15. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) of no daily or weekly use of sugar-sweetened drinks at 6 months of age according to social inequalities and characteristics (n=1684).

Characteristics	n*	n§	No use of sugar-sweetened drinks	
			Crude OR (95 % CI)	Adjusted ¹ OR (95 % CI)
Mother's education level (years)				
≤10	85	80	1.00	-
11-12	495	478	1.76 (0.63, 4.90)	
≥13	1104	1089	4.54 (1.61, 12.80)	
<i>p for trend</i>			0.004	
Father's education level (years)				
≤10	133	123	1.00	1.00
11-12	757	739	3.34 (1.51, 7.40)	3.09 (1.36, 7.06)
≥13	794	785	7.09 (2.83, 17.80)	5.74 (2.17, 15.19)
<i>p for trend</i>			<0.001	0.002
Mother's age group (years)				
<25	153	143	1.00	-
25-34	1163	1142	3.80 (1.76, 8.24)	
>34	368	362	4.22 (1.51, 11.82)	
<i>p for trend</i>			0.002	
Mother's employment status				
Before giving birth				
Working	1426	1403	1.00	1.00
Not working	258	244	0.29 (0.15, 0.56)	0.36 (0.18, 0.74)
<i>p-value</i>			<0.001	0.005
Degree of urbanization (no. of inhabitants)				
<2000	486		-	-
2000-19999	412			
20000-99999	243			
≥100000	543			
<i>p for trend</i>				
Maternal marital status				
Married /cohabitant	1625		-	-
Not married/cohabitant	59			
<i>p-value</i>				
Maternal smoking at 6 months				
Smoking	251	238	1.00	-
Not smoking	1433	1409	3.21 (1.61, 6.39)	
<i>p-value</i>			0.001	

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are not using sugar-sweetened drinks on a daily or weekly basis at 6 months of age.

¹Adjusted for infant gender, number of childbirths and breastfeeding at 6 months, plus the other variable in the adjusted table.

- No significant association found for the variable in the analysis.

5.3.5 Vitamin D supplementation

Social inequalities for receiving vitamin D supplementation at 6 months were found with regard to maternal education ($p=0.02$). Maternal smoking was inversely related to receiving vitamin D (Table 16). The odds for using some sort of vitamin D supplementation was 50 per cent higher in the most educated group compared to those in the least educated group.

Table 16. Crude and adjusted odds ratios (ORs) and 95 % confidence intervals (CIs) using vitamin D supplements at 6 months of age according to social inequalities and characteristics (n=1686).

Characteristics	n*	n§	Vitamin D-user			
			OR	Crude (95 % CI)	Adjusted ¹ OR	(95 % CI)
Mother's education level (years)						
≤10	86	57	1.00		1.00	
11-12	496	370	1.49	(0.92, 2.44)	1.06	(0.66, 1.72)
≥13	1104	922	2.58	(1.60, 4.14)	1.50	(0.93, 2.41)
<i>p for trend</i>			<0.001		0.02	
Father's education level (years)						
≤10	134	101	1.00		-	
11-12	757	591	1.16	(0.76, 1.79)		
≥13	795	657	1.56	(1.01, 2.40)		
<i>p for trend</i>			0.03			
Mother's age group (years)						
<25	153		-		-	
25-34	1164					
>34	369					
<i>p for trend</i>						
Mother's employment status						
Before giving birth						
Working	1428	1160	1.00		-	
Not working	258	189	0.63	(0.47, 0.86)		
<i>p-value</i>			0.003			
Degree of urbanization (no. of inhabitants)						
<2000	488	367	1.00		-	
2000-19999	412	327	1.27	(0.93, 1.74)		
20000-99999	243	194	1.31	(0.90, 1.90)		
≥100000	543	461	1.85	(1.36, 2.53)		
<i>p for trend</i>			0.003			
Maternal marital status						
Married /cohabitant	1627		-		-	
Not married/cohabitant	59					
<i>p-value</i>						
Maternal smoking at 6 months						
Smoking	252	176	1.00		1.00	
Not smoking	1434	1173	1.94	(1.44, 2.62)	1.49	(1.10, 2.03)
<i>p-value</i>			<0.001		0.01	

*Numbers within each category of the independent variables.

§Numbers within each category of the independent variables that are using vitamin D supplementation at 6 months of age.

¹Adjusted for infant birth weight, number of childbirths and breastfeeding at 6 months, plus the other variable in the adjusted table.

- No significant association found for the variable in the analysis.

When examining social differences between the maternal educational groups in the infant age for introduction to vitamin D supplementation, no significant differences were found between the groups, $p=0.36$ (data not shown).

Generally, the same trends with increasing positive infant feeding behaviour are also seen if educational level is divided into four categories with the > 13 years of education divided into two groups, bachelor degree and more than bachelor degree (results not shown). This shows the social gradient to be increasing; the difference between the highest and the lowest educational groups may be even greater than these results show.

5.4 Summary of results

Social inequalities are seen in several infant feeding practices with increasing maternal education being the one variable mostly associated with good feeding practices. Only exclusively breastfeeding at 6 months, breastfeeding at 1 week and introduction to solid foods do not show social inequalities. Analyses of all the infant feeding practices except for exclusive breastfeeding at 1 week, resulted in differences with regard to one or more social characteristic(s) (Table 17).

Table 17. Summary of results. All infant feeding practices valued “yes” if multiple regression analyses resulted in significant results for social inequalities and/or differences in social characteristics.

Infant feeding practices	Social inequalities¹	Differences in social characteristics²
<i>Exclusive breastfeeding</i>		
1 week	Yes	-
4 weeks	Yes	Yes
4 months	Yes	Yes
6 months	-	Yes
<i>Breastfeeding</i>		
1 week	-	Yes
4 weeks	Yes	Yes
4 months	Yes	Yes
6 months	Yes	Yes
<i>Introduced to solid foods</i>	-	Yes
<i>No use of sugar-sweetened drinks</i>	Yes	Yes
<i>Vitamin D supplement</i>	Yes	Yes

¹Maternal and paternal education as indicator for social inequalities

²Maternal age, employment status, marital status, smoking at infant age of 6 months and degree of urbanization as social characteristics

6. Discussion

The analyses from the current Spedkost survey have shown social inequalities to be present in almost all examined infant feeding practices. This is in line with several other studies from industrialized countries (22;59;79). Our results show that adherence to the infant feeding recommendations is highly sensitive to social inequalities. The higher the socio-economic position into which a child is born, the better the odds that the child is fed in accordance with public health recommendations. Breastfeeding initiation, duration and its exclusivity and the usage of vitamin D supplements, improve with educational level of either the mother or the father or both, as well as infant age of breastfeeding cessation. Furthermore, an early introduction to solid foods, using formula and water, and the intake of sugar-sweetened drinks follow a reverse pattern. However, no differences were seen regarding juice consumption and age for starting vitamin D supplementation.

6.1 Methodological considerations

6.1.1 Subjects

The large number of participants and an acceptable response rate (66 %) compared to other similar studies (21;57;75;80) are important strengths of the survey. No indications of differences between responders and those invited were found regarding geographic region. When comparing data on the responders with available data from Statistics Norway (SSB) on all Norwegian births in 2006, no differences were seen regarding infant gender, infant birth weight or parity, but this was not tested statistically. Small differences were seen for marital status and maternal age between the Spedkost participants and the total Norwegian population. Only 2 per cent more mothers were employed before delivery in the Spedkost population compared to the Norwegian data on employment. This indicates that the Spedkost sample does not differ from the rest of the comparable Norwegian female population regarding working situation.

The educational level in the Spedkost survey is higher than the national numbers on education. In Spedkost 2006, 63 per cent of the mothers have college or university education. The same is seen when examining paternal educational level; the results from Spedkost with 44 per cent of the fathers being in the highest education group are considerably higher than among Norwegian men, where 28 per cent aged 20-49 have 13 years or more of education. The groups willing to respond on such surveys are more educated than the general population. As a result, the subjects from Spedkost are not representative of the total Norwegian population with regard to educational level. This is in line with previous research that shows population-based samples to typically under-represent the most socioeconomically disadvantaged and over-represent the advantaged (80;81).

Compared to the first Spedkost survey with an eighty per cent response rate (57), this Spedkost survey has a lower response rate. Response rates in epidemiological studies has had a general decrease the last ten years (82), and this might be a problem when analyzing results from such surveys.

Generally, selection bias reduces the external validity, and the opportunity to generalize our findings may be diminished (83).

6.1.2 Study design

One of the limitations of cross-sectional studies is that they usually cannot predict causality (82). In the Spedkost 2006 study, an association between social background and infant feeding is present. However, because of the time aspect of the survey, it is difficult to conclude that the individual's socioeconomic position is the direct reason for the inequalities in breastfeeding and the other infant feeding practices.

6.1.3 Methods

Epidemiological studies

In epidemiological studies it is more likely to underestimate than overestimate the effect estimates, usually because of misclassification of the various explanatory variables (84). Turell et al. assessed whether studies that found statistically

significant associations between socioeconomic status and food-related behaviour may have used a research design that underestimates the magnitude of the association (81). The comparison suggested that studies that draw their samples from electoral rolls and then collect data using a mail-survey questionnaire might greatly understate the level of socioeconomic inequality in food-related behaviour in the wider community. Therefore, it is possible that the results from Spedkost 2006 underestimate the real social inequalities existing in infant feeding practices.

Retrospective method

One potential weakness of this study is that data on feeding pattern during the first half year of life were collected when infants were 6 months old. This may have led to some recall bias when recording the timing of infant feeding patterns.

It is possible that for breastfeeding which often occurs at time of stress and sleep deprivation, recall of past events might be especially prone to bias and/or imprecision (85). In addition, social pressures in Norway to breastfeed might result in overestimation of breastfeeding duration.

A validation study by Gillespie and collaborators found that breastfeeding duration among short-term breast-feeders tended to be overestimated when measured retrospectively (85). Estimation of breastfeeding duration increased with recall time; 2 weeks and 1 month overestimation were seen for 6 month and 1-3.5 year recall respectively. Reported age of weaning was significantly higher for six-month recall than for initial reported weaning age. These results were based on breastfeeding cessation and did not examine recall on ending exclusive breastfeeding (85). This might in Spedkost underestimate the social differences since the socially disadvantaged seem to end breastfeeding earlier than mothers with higher education do. However, the opposite could also be seen, since well educated women are more prone to overestimate breastfeeding duration (86). Some studies in the U.S. have reported underreporting among long-term breastfeeders (8-12 months) and breastfeeding duration among short-term breastfeeders tended to be overestimated (85;87). However, the Spedkost study was conducted among 6 months old infants so it is not possible to use this definition to classify any as long-term breastfeeders yet.

Bland et al. found poor recall for exclusive breastfeeding duration when recall was done at infant age of 6-9 months compared to longitudinal data collected at weekly intervals (88). The recall was particularly poor for the early weeks of infant life. More than half of the study population overestimated the duration of exclusive breastfeeding. However, a study evaluating dietary assessment among Swedish infants found breastfeeding data obtained in retrospective interviews at six months to have good validity compared to regular notations on feeding made at the Child Health Centre (89). A recent review examining 11 studies suggested that maternal recall is a valid and reliable estimate of breastfeeding initiation and estimation, especially when the duration of breastfeeding is recalled after a short period (≤ 3 years) (90).

Food frequency questionnaire

The SFFQ used in this survey has both strengths and limitations. Generally the questionnaire is not very challenging for participants, which makes a representative population more probable. Additionally the SFFQ makes it easier to recruit participants from a large geographical area. The portion sizes and quantifications may be hard to recall. Furthermore, the time/age intervals available for recording may not be representative, food specifications are limited and these questionnaires are not open-ended.

When planning the Spedkost 1998 survey, using a FFQ was considered the best method to fulfill the primary objectives and to secure efficient adaptation and a quick report (91).

Using food frequency questionnaires for dietary assessments in large groups have been extensively investigated and are considered to be an affordable, effective and valid tool to achieve information concerning the habitual dietary intake of infants and young children (92-95). The respondent's eating habits are not affected by this assessment method as is seen with prospective methods where caregivers who are being observed may alter their children's diet to make it more socially acceptable (95;96). Although when filling in SFFQs parents may report more in line with the recommended diet (96). Andersen et al. have reported SFFQs among 1 year old

children to be good instruments to map food selections (92). Furthermore, as the SFFQs usually are precoded, data processing is fairly simple and inexpensive. Evaluations from Spedkost 1998 show that a majority of parents find these sorts of SFFQs comprehensible and easy to fill in (91).

Another limitation of this study might be that the SFFQ used in both Spedkost surveys were never validated. It was assumed that the diet at 6 months was dominated by breast milk and that infants at this age were fed a relative limited amount of food items, and thus not necessary to validate. However, a review article by Scanlon and co-workers concluded that in general when examining the validity of breastfeeding measurement, the correlations between the validation standard and test method were highest for doubly labeled water and test weighing (97).

Indicators of socioeconomic position

Research has proposed that when studying social inequalities in health outcomes it is of great importance to use a wide array of indicators for socioeconomic position (SEP) to be able to capture the variability of contribution to inequalities from different factors (98). There are numerous ways to describe and measure socioeconomic conditions. Income, occupational class and education are frequently used (22;59;79;99;100). Among children, parental education and occupation, household income and household conditions are the most important indicators (18). Moreover, a WHO-report on measuring socioeconomic inequalities in health by Kunst and Mackenbach states that whenever possible, socioeconomic status should be measured by three indicators: occupational status, level of education and income level (101).

It is not useful or theoretically compelling to search for a single “best” indicator of SEP (98). Each indicator will emphasize a particular aspect of social stratification and most SEP indicators are, to different degrees, associated with each other because they all measure aspects of the underlying social stratification. However, correlations between the most widely used indicators for measuring socioeconomic position in developed countries, education, income and occupation, are relatively weak (0.3-0.6) (102;103). These results suggest that each index explains a different component of

social class variability which contributes differently to health inequalities (104), and it is therefore preferable to use all three instead of only one.

If the central interest is to show the existence of a socioeconomic gradient in a particular health outcome then the choice of indicator may not be crucial. However, using different indicators of socio-economic position (SEP) may result in gradients of varying slopes (18).

Diet and socioeconomic position have been investigated to examine whether the use of different indicators gives different results. Galobardes et al. found both education and occupational class to significantly contribute to determining a less healthy dietary pattern for those from low social class (104). The effects of education and occupation on dietary habits were usually additive, and even synergistic for some food groups. They concluded that assessing both education and occupation improves the description of social class, as they act, most of the time, as independent factors. An Australian study examining food purchasing behaviours found the socioeconomically disadvantaged groups to be least in accordance with dietary guideline recommendations (105). Furthermore their use of separate indicators for education, occupation and household income each adds something unique to the understanding of how socioeconomic position is related to diet: each indicator reflects a different underlying social process and hence they are not interchangeable and do not serve as proxies for one another. Literature reflects that even though several SEP indicators are reported available, single indicators are used grounded on the assumption that they measure the same (106).

Education

Education is frequently used as indicator of socioeconomic status in epidemiological studies and is thought to capture the knowledge-related assets of an individual (17). It is also related to lifestyle, problem solving abilities and values (102). The relationship between diet and education is presumed to reflect a person's ability to access and interpret health-related information (104).

The widespread use of education as an indicator of socioeconomic position may be due to the fact that it is relatively easy to measure in self-administered questionnaires

and response rates to educational questions tend to be high, compared to others more difficult to assess and sensible measurements such as income (17). It can also be obtained independently of age or working circumstances. In addition it is generally available for both genders, excludes few members of the population, is less subject to negative adult health selection and it is a clearly hierarchical measure (107). Furthermore previous studies have suggested that education is the most stable indicator of SEP as it captures processes that occur early in life and tend not to change over time (108).

Reported limitations are tied to comparisons to other studies, especially between different countries where the meaning and attainment of educational level varies. A further limitation in the use of educational levels exists, particularly among minorities, for individuals who have obtained their education outside their country of residence, where indicators of education may have very different implications than within the host country. As ethnic minority was an exclusion criterion in the current study, this might not be a large problem here.

Once established, the level of education is almost not subject to change, and is therefore perhaps less applicable than occupation and income when it comes to tackling important intervention questions (107).

The proportion of people reaching higher levels of education has dramatically increased in many countries during the recent years, particularly among women and minority ethnic groups (17). In the Norwegian population the same tendency is seen, where women aged 25-29 are the group with the highest proportion having education at university or college level (109). This general increase may weaken education as a measure for socioeconomic status (107). Because fewer persons belong to the lowest educational group, it is possible that the cut-off for the different categories has to be elevated to create categories that reflect higher completed education. Still, stratification by education is probably the best measure when comparing results from different populations (110).

In Spedkost, education was the only socio-economic position (SEP) indicator available. We did not have the opportunity to include the two other SEP indicators

mostly used together with education when measuring SEP among children; household income and parental occupational status. Our results may therefore not reflect all the aspects of social inequalities in the infants' diet. Research has reported that results may underestimate true differences when only one SEP indicator is used because only one component of the socioeconomic position is assessed (104).

However, literature has shown that if one can only select one indicator, the level of education is likely to be a good choice in many circumstances, because it is easy to measure and important in determining health status (101). An American study concluded that if the use of SEP-indicators is limited to one single indicator because of financing or time pressure, and if the research goal does not intend otherwise, high education will be the best socioeconomic predictor for good health (111). Other studies conclude differently; as single indicator for SEP, occupational class represents inequalities better than education (112). Finally measuring social inequalities among children creates greater uncertainties than among adults since children's SEP is based on their parents socioeconomic position (6).

Differences in social characteristics

To measure differences concerning social characteristics, five variables were chosen because of their social distribution (see Table 3). The results showed social inequalities in smoking status, marital status, age, employment status before delivery and degree of urbanization. When examining maternal characteristics according to maternal educational level, the highest educated mothers smoked less, a higher proportion was married/cohabitant, more were working before giving birth, they were older and lived in more urbanized areas. These variables were then used as social inequality proxies and defined as differences in social characteristics in addition to the already available social inequality indicators, maternal and paternal education.

When direct measures of socioeconomic position (SEP) are not available, some researchers use proxy indicators. These indicators can be strongly correlated to SEP. Social characteristics such as having a single mother are circumstances that often results in low SEP. These proxy indicators are not indicators of SEP itself, but

because of their strong correlation they may provide valuable information when direct measures are not available. However, it is always important to consider alternative explanations of their association with health outcomes.

In literature the inequality proxies used in this study have been used as indicators of social inequality (22), but mostly they are used as socio-demographic characteristics when group differences in infant feeding practices are to be described (57).

Unemployment

Unemployment can be used as a measure of socioeconomic position (SEP). However, as we only received data on before birth employment, working status has only been used as a proxy indicator in this study. Employment status has the advantage that it is fairly straightforward to measure (17). However, it may also be useful to know the duration of unemployment, as sustained periods of being unemployed will have different financial and health implications compared to brief periods of unemployment. Unemployment does not occur at random and people in occupations that are not well paid are more likely to experience unemployment (17).

Smoking

In many countries the likelihood of smoking is linked to socioeconomic position: lower status, more smoking (113). The same tendency is seen in Norway, both age for smoking initiation, the use of the most dangerous cigarette products and passive smoking are following a social gradient, where those with the highest educational level come better off (6). Another Norwegian study found smoking to be much more common among people with low socioeconomic background (114). Kahn and coworkers found women with little education more likely to smoke before delivery, less likely to quit during pregnancy, and more likely to relapse after delivery (115).

Marital status

Being a single mother often results in having a low SEP, for example unemployment due to the inability of obtaining a flexible job, and economic hardship can be associated with single motherhood (116). Inequalities in health exist between single and couple parents and have been found in previous studies (117). This inequality may largely derive from an uneven distribution of certain socio-demographic and

socioeconomic characteristics. In a Swedish study, single fathers and single mothers had a low financial status, which again had a major impact on health (118). In Statistics Norway's Health survey from 2002, no statistical differences in proportions having low education were found between being single or in a couple (119). However, another report states that the low-income proportion is higher among children having single parents, 6.6 per cent, than among children living with two parents, 2.2 per cent (120). Single parents have also been reported to be significantly more likely to have financial problems than people being couples, with low or high education or singles not having child responsibility (6).

Maternal age and Degree of urbanization

Both maternal age and living area have in previous research been used when measuring social inequalities in infant feeding (22). Data on educational level according to degree of urbanization in Norway was not found available. However, the university counties have a higher educational level and these counties contain some of Norway's largest cities (109;121).

Other methodological considerations

The Teleform computer software is widely used when processing clinical data. A few validation studies have been performed measuring to what extent the Teleform program rightfully interprets the questionnaires when reading the scanned versions. A test performed in Trondheim has shown Teleform to be accurate and the results to be reliable. The only problem was when marks were crossed out, 28 per cent of them were then read as real marks (122). This, however, might not give very wrong results in Spedkost since double marks usually were treated as a mean of the two marks.

Statistics

The regression analyses were performed after excluding all individuals with missing data in the examined variables. The results could be biased if the missing data were not missing at random. However, results were the same when all available data in the different variables were included in the analyses.

Some of the examined variables like exclusive breastfeeding and the use of sugar-sweetened drinks both at 6 months, included few individuals in the analyses. This

made some of the variable categories to represent less than 10 individuals making the results not so strong.

Given the complexity of factors that affect breastfeeding outcomes, some of the differences may be due to other not examined factors.

6.2 Findings discussion

Generally, when making comparisons between studies examining social inequalities in infant feeding, great care is needed because of the use of different methods of data collection, breastfeeding definitions and various definitions of socioeconomic position or social inequalities.

It is essential to document the cultural and social factors influencing the shorter duration of breastfeeding among mothers with a lower socioeconomic position. For example, pre-natal attendance in breastfeeding class, breastfeeding self-efficacy, type of delivery (Caesarean section), in-hospital supplementation (123) and partners negative attitude (80), length of maternity leave, mother's type of work and the number of working hours (22), intention to breastfeed and pacifier usage (124) could interfere separately or in combination with breastfeeding. Determinants of breastfeeding could be divided into five main groups (125):

- i) Demographic attributes
- ii) Psychosocial attributes
- iii) Health care attributes and biomedical constraints
- iv) Community attributes
- v) Public policy

The results from the Spedkost survey are only examining the demographic attributes.

6.2.1 Exclusive breastfeeding

In Spedkost 2006, exclusive breastfeeding at 1 week of age was found to be significantly associated with maternal education. In addition to this, maternal marital status and maternal smoking were also significant with regard to exclusive breastfeeding at 4 weeks of age. This is in line with a study in Quebec that found

maternal education and family type significantly associated with exclusive breastfeeding at birth, but smoking status was not accounted for in this analysis (22).

The Millennium Cohort study has findings in agreement with our results (59). The study examined exclusivity of breastfeeding with regard to social class at infant age of 1 month, 4 months and 6 months. As indicator of social inequalities, they used social class by occupation divided into seven categories. Education was not included in their models and data were collected at infant age of 9 months. They found clear social inequalities for the initiation of breastfeeding, at 1 month and at 4 months, and described social differences to be apparent over time, although exclusive breastfeeding rates at 6 months were too low to examine. Initiation and exclusive feeding rates were higher among mothers aged 30 years or older, who were non-smokers, living in higher-income households, and those who lived with a partner.

The first Norwegian survey on infant feeding from 1998 (Spedkost 1998) examined factors associated with exclusive breastfeeding at 4 months (57). At this age, maternal age, maternal education, maternal smoking, maternal marital status and degree of urbanization were all significantly associated with exclusive breastfeeding, almost in agreement with the results from Spedkost 2006, where all the same factors with the exception of maternal marital status, were significantly related to exclusive breastfeeding. Lande et al. (2003) had a higher participation rate, and their analyses were based on a larger number of individuals than Spedkost 2006. This may have resulted in the latter not being able to find associations between marital status and exclusive breastfeeding practice. However, the levels of inequalities and differences in social characteristics in the Spedkost 1998 and 2006 respectively, are almost the same.

There are generally few mothers, even in the Nordic countries with high breastfeeding rates, that follow the WHO recommendation of exclusive breastfeeding until the infant age of six months (126-128).

In the current Spedkost survey, exclusive breastfeeding at six months gave significant positive results for increasing maternal age and mothers not smoking. To our knowledge, few other studies have examined these associations, and no

significant results have been found (59;123). This may be due to a very low exclusive breastfeeding rate at 6 months, which therefore generates difficulties with analyses based on very small groups. A Canadian study examined the predictors of exclusive breastfeeding duration among first-time mothers (123). They found no differences in social characteristics for exclusive breastfeeding at 6 months.

However, after adjusting for socio-demographic factors, personal and contextual factors like breastfeeding self-efficacy, maternal and paternal infant feeding beliefs and perceived infant satisfaction with breastfeeding, showed a significant positive association. The exclusive breastfeeding rate at 6 months was only 7 per cent, though, which could explain why they were not able to find differences in social characteristics.

In this current analysis, when examining exclusive breastfeeding at 4 months, an interaction effect was found between infant birth weight and paternal education. When stratifying on weight, paternal education was only significantly associated with exclusive breastfeeding at infant birth weight between 2500 g and 3500 g. At this weight, the infant may be slightly underweight or premature. It is likely that in such a situation, when breastfeeding often is physiologically more difficult, support from the father is more important compared to when the infant has a higher weight. Moreover paternal support has been reported to be positively associated with breastfeeding duration (80;129), as well as the existence of a negative association between low infant birth weight and breastfeeding rate (57;130). At an infant birth weight of less than 2500 g, there would be more medical obstacles so that paternal support may not decide whether the infant is exclusively breastfed or not. However, this needs to be investigated further.

6.2.2 Breastfeeding

In this thesis, no social inequality was seen when examining breastfeeding at 1 week, although maternal employment status before giving birth gave significant results. The breastfeeding initiation in our sample is very high, 98 per cent of all infants are breastfed at 1 week of age. One might think those not breastfed may be due to e.g. medical factors not being socially distributed in the population.

A German cohort study of 3822 mothers found 90 % to initiate breastfeeding and mothers with less than 10 years of education were more likely not to initiate breastfeeding (80). They might be able to find differences between educational groups because of relatively lower breastfeeding initiation than in Norway, 90 versus 98 per cent. Dubois and Girard found similar results in a Canadian cohort (the LSCDQ-study) where increasing maternal educational level was significantly associated with breastfeeding at birth (22).

At 4 weeks, however, social inequalities are manifested in the Spedkost 2006 sample showing increasing maternal education to be positively associated with breastfeeding, as well as mothers working before giving birth and not smoking. Breastfeeding difficulties are mostly seen during the first 4 weeks after birth (131), and at 4 weeks of age, breastfeeding is usually established. The gap in breastfeeding rates between infants of different socioeconomic positions is increasing with infant age (see Figure 4).

In this current analysis, breastfeeding at 4 months is positively associated with both maternal and paternal educational level, maternal smoking and employment. Results from the LSCDQ-study support these findings showing both higher maternal age, better education, and being in a two parent family to be positively associated with breastfeeding at this age (22).

Breastfeeding duration of less than 4 months has been reported in a German cohort to be strongly correlated to smoking, lower education and Caesarean section (80).

This thesis found a strong association between breastfeeding at 6 months and mothers and fathers being well educated, mothers working before delivery and not smoking.

In Spedkost 1998 Lande and collaborators found breastfeeding at 6 months to be positively associated to increasing maternal age, education and degree of urbanization as well as mothers not smoking (57). The same is seen in other research examining social inequalities in breastfeeding (22).

Kogan et al. performed a multivariate analysis of state variation in breastfeeding rates in the U.S. (132). They found socio-demographic and maternal factors not to account for most breastfeeding rate variation at infant age of 6 months. The rates varied mostly with states having breastfeeding legislation or not, and concluded that breastfeeding differences most of all may reflect cultural norms.

A review by Dennis reported that women who initiate and continue breastfeeding tend to share a number of the following characteristics: they are older, have a high income, are non smokers, better educated and married (133). Some studies do not support these findings and are not able to find associations between education and long duration of breastfeeding (129).

The German Health Interview and Examination Survey for Children and Adolescents (KiGGS) gave results that show an increase in the breastfeeding rate from 1986 to 2005 (134). Across all studied age groups, 76.7 % of the children were ever breastfed. The rate of ever breastfed children was significantly lower in mothers from socially disadvantaged population groups or children of mothers who had smoked during pregnancy.

Kohlhuber et al. found smoking not to influence breastfeeding initiation in multivariate analysis, but it was a strong influencing factor on breastfeeding duration (80). Light smoking is not considered contradictory to breastfeeding by the American Academy of Pediatrics (135). Smoking mothers are advised to breastfeed since their children fare better regarding general health, respiratory illness and risk of sudden death syndrome when they are breastfed (135). This is in line with the Norwegian breastfeeding recommendations (56). A conflict between the wish to initiate breastfeeding and the urge to restart smoking after delivery may explain lower breastfeeding rates among smoking mothers. A concern about the potential harm to their children when breastfeeding and smoking at the same time may then prevent breastfeeding (80). Kohlhuber and co-workers also state that it is also possible that mothers gave socially preferred answers to the smoking questions and claimed not to smoke even if they did (80). Other reviews and studies have found

strong associations between initial breastfeeding and maternal smoking (125;133) as well as duration of breastfeeding and maternal smoking (136).

6.2.3 Formula and additional fluids

There is concern over the increasing trend for infants to be given fruit drinks, often as a replacement of breast or formula milks, as this could lead to a deficiency in calcium (137). However, in the present study, no differences between the maternal educational groups were seen in infant juice consumption. Other researchers have shown that meeting the American Academy of Pediatrics' (AAP) juice consumption recommendations (introduced after 6 months, 100% juice and limited to 1.8 dl daily) at infant age of 12 months to be positively associated with mothers having completed college education (62).

The correlation between maternal education and proportions receiving formula and various additional fluids to breast milk was examined. We found significant differences between the maternal educational groups for receiving formula, water and sugar-sweetened drinks, all at 6 months of age. A Canadian study found drinking formula at birth, at 2 and 4 months to be positively associated with higher educated mothers, but the association was not present at infant age of 6 months (22).

6.2.4 Introduction to solid foods

Complementary feeding before the infant age of 6 months was examined in Spedkost 2006. Maternal age and smoking gave significant results. Lande et al. examined timely introduction of solid foods in Spedkost 1998 and found significant results of more variables; maternal age, education, smoking, and degree of urbanization (57). However, timely introduction was then defined as not receiving semisolid or solid foods before the infant age of 4 months. A higher proportion of that sample was following the recommendations (79 %) than in the Spedkost 2006 sample where only 12 per cent delayed weaning until infant age of 6 months. An American review found that infant weaning before 3 months of age was associated with maternal smoking. They found a more than 90 per cent increased risk for early weaning when mothers were smoking (136). Hendricks and coworkers reported older mothers to

follow the delayed complementary feeding until 4 months in to a greater extent compared to mothers being younger (62). UK data on weaning practices show introduction of solid foods before 3 months to be associated with families having markers of deprivation (138). The same is reported elsewhere (139).

To our knowledge, no other published studies have analysed social inequalities in delayed introduction of solid foods until the infant age of 6 months.

6.2.5 Sugar-sweetened drinks

In Spedkost 2006, increasing paternal educational level and mothers working before giving birth were significantly associated with infants not receiving sugar-sweetened drinks at 6 months of age. One possible explanation might be that at the infant age of 6 months, most mothers still breastfeed, and when infants want something to drink, breast milk is usually available. Fathers, however, must serve other available fluids, and men who are lower educated drink more sweetened beverages (26). It is thinkable that lower educated men will be more susceptible to serve their children sugar-sweetened drinks. However, few infants drink sugar-sweetened beverages when they are only 6 months, 48 of 1984 (2.4 %) infants received squash or nectar in our material, and no other studies, as far as we know, have examined social inequalities in the sweetened drinks consumption at this age.

Lande et al. examined the relationship between socio-demographic factors and no daily use of sweetened drinks at 12 months, and found a positive association with increasing degree of urbanization and mothers not smoking (75). Mothers having completed college were in an American study found to be negatively associated with infants consuming sweetened beverages at 12 months (62). This is in agreement with findings from other industrialized countries (140).

6.2.6 Vitamin D supplementation

Spedkost 2006 found increasing odds for vitamin D supplementation with higher maternal education. However, mothers not smoking were almost 50 per cent more likely to give their infants vitamin D supplementation. Factors associated with

vitamin D supplementation at 6 months were also studied by Lande et al., and increasing odds were found for increasing maternal age and education (57).

Little research is done on inequalities in infant vitamin D supplementation. However, a Finnish study found that the higher the maternal education, the less often was the children's total vitamin D intake adequate at the age of 3 and 6 months (141). Most of the vitamin D intake was in supplement form, although there were no differences between the educational groups regarding the use of this supplementation. Moreover, vitamin D supplements were more frequently used among 1- and 2- year-old children of mothers aged > 25 years compared to the younger mothers. Icelandic research has reported increasing maternal age and high-income families to be positively associated with infants receiving vitamin D supplements (58).

7. Conclusion

Knowledge of factors associated with breastfeeding and other infant feeding practices during the first half year of life is important for continued breastfeeding promotion and to reduce inequalities in infant feeding.

The breastfeeding rate in Norway has increased over the last decade and the majority of Norwegian infants are breastfed during the first 6 months of life.

Our results show that social inequalities exist in exclusive breastfeeding at the infant age of 1 week, 4 weeks and 4 months. Differences in one or more social characteristic(s) were shown at all examined infant ages, with an exception for exclusive breastfeeding at the infant age of 1 week. Regarding breastfeeding, at all ages, differences in social characteristics were found, and there are social inequalities at infant age of 4 weeks, 4 months and 6 months, as well as in infant age of ending breastfeeding.

Both social inequalities and differences in one or more social characteristics were seen with regard to receiving sugar-sweetened drinks and vitamin D supplements, however, introduction to solid foods were only associated with the social characteristics. Social inequalities also exist regarding water- and formula consumption, while juice intake was the same among infants having mothers of different educational background.

In summary there are a number of vulnerable groups that have been shown to be at increased risk of not following the national Norwegian infant feeding recommendations. They are characterized as lower educated mothers and fathers, mothers being unemployed before giving birth, mothers smoking and being a single parent, younger mothers and mothers living in less crowded areas. Furthermore, the adherence to different infant feeding recommendations is interrelated, indicating an accumulation of bad nutritional circumstances for children further down the social hierarchy.

Breastfeeding and infant nutrition could be related with different health and cognitive outcomes in childhood and later in life. Consequently, social inequalities in diet during infancy may play a role in the development of social and health inequalities observed at the population level.

In conclusion, intervention to improve adherence to infant nutrition recommendations needs to be particularly targeted and prioritized towards those being socially disadvantaged.

This study indicates that an individual's socio-economic position and social characteristics may be of importance for breastfeeding and other infant feeding behaviours. From a public health perspective, continued promotion of healthy feeding behaviour is needed to reduce the reported inequalities seen in the especially vulnerable groups.

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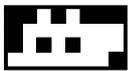
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Appendices

Appendix 1



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SPEDKOST 2006 - 2007

Undersøkelse av kostholdet blant spedbarn

Kryss av for "Ja" i ruten under dersom du samtykker i å delta i undersøkelsen. Dersom du ikke ønsker å delta og vil reservere deg mot å bli purret på, kryss av for "Nei" og returner skjemaet.

Ja

Nei

Ved utfylling er det viktig at du går frem slik:

* Sett kryss i boksene. Slik: Ikke slik:

* Ved rettelser kan du markere tydelig at det er feil, slik: 

* I de åpne feltene skriver du inn tydelig tekst

* Der det spørres etter tall, skriver du disse slik:

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

* Skjemaet må ikke brettes

* Det utfylte skjemaet vil bli lest av en maskin. **Bruk blå eller sort kulepenn.**

Husk å ta med spørreskjemaet til helsestasjonen ved 6-månederskontrollen for påføring av opplysninger om barnets vekt og lengde.

Hvis du har glemt å ta med skjemaet på kontrollen eller hvis barnet har vært på 6-månederskontrollen før du mottok skjemaet, ber vi deg skrive inn opplysninger om barnets vekt og lengde på skjemaet selv. Dersom barnet ikke kommer til 6-månederskontroll på helsestasjonen innen svarfristen, ber vi deg likevel å besvare resten av skjemaet så godt du kan og returnere det.

Fylles ut på helsestasjonen ved 6-månederskontrollen

Dato for 6-mnd kontrollen:

--	--	--	--

dag mnd

Barnets vekt (6 mnd):

--	--	--	--	--

gram

Barnets lengde (6 mnd):

--	--

cm

Fødselsvekt:

--	--	--	--

gram

Lengde ved fødsel:

--	--

cm



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BAKGRUNNsspørsmål om barnet

1. Dato for utfylling av skjemaet

Skriv inn datoen for dag og måned i rutene

--	--	--	--

dag mnd

2. Hva er barnets kjønn?

Sett ett kryss

Jente

Gutt

3. Når ble barnet født i forhold til ultralydstermin?

Sett ett kryss

I 38. svangerskapsuke eller senere

Før 38. svangerskapsuke

4. Hvor mange barn har mor født?

Sett ett kryss

1 barn

2 barn

3 barn

4 barn eller flere

5. Hvem fyller ut skjemaet?

Sett ett kryss

Barnets mor

Barnets far

Både mor og far

Annen person

SPørsmål om morsmelk

6. Hva slags melk/annen drikke fikk barnet den første leveuken?

Her kan du sette flere kryss

Morsmelk

Vann

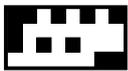
Sukkervann

Morsmelkerstatning

Annet

Vet ikke

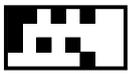




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7. Får barnet morsmelk nå, eventuelt noe i tillegg til morsmelk?*Med fast føde menes alle andre matvarer enn vann/melk/saft/juice/annen drikke og kosttilskudd.**Fast føde inkluderer velling selv om denne er tyntflytende.**Sett ett kryss* Ja, bare morsmelk (og eventuelt tran eller annet kosttilskudd) ⇒ *Gå til spm 8 og deretter til spm 24* Ja, morsmelk og vann/juice/saft o.l. ⇒ *Gå til spm 8 og deretter til spm 21* Ja, morsmelk og fast føde samt eventuelt vann/juice/saft o.l. ⇒ *Gå til spm 8 og deretter til spm 13* Ja, morsmelk og morsmelkerstatning/annen melk ⇒ *Gå til spm 8 og deretter til spm 11* Ja, morsmelk og morsmelkerstatning/annen melk og vann/juice/saft o.l. ⇒ *Gå til spm 8 og deretter til spm 11* Ja, morsmelk og morsmelkerstatning/annen melk og fast føde samt eventuelt vann/juice/saft o.l. ⇒ *Gå til spm 8 og deretter til spm 11* Nei, men barnet har fått morsmelk tidligere ⇒ *Gå til spm 9* Nei, barnet har aldri fått morsmelk ⇒ *Gå til spm 10***8. Hvor mange ganger i døgnet får barnet vanligvis morsmelk nå?***Regn også med de gangene barnet bare får morsmelk til trøst eller kos, dag- og nattetid.**Sett ett kryss* 1 gang 2-3 ganger 4-5 ganger 6-7 ganger 8-9 ganger 10 ganger eller flere**9. Hvor gammelt var barnet da det sluttet å få morsmelk?***Sett ett kryss*

Uker							Måneder								
1	2	3	4	5	6	7	2	2,5	3	3,5	4	4,5	5	5,5	6
<input type="checkbox"/>															



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10. Hva var viktigste og nest viktigste grunn til at mor ikke ammet barnet eller har sluttet å amme det?

Sett ett kryss for viktigste grunn og ett kryss for nest viktigste grunn

	Viktigste grunn	Nest viktigste grunn
Sugeproblemer	<input type="checkbox"/>	<input type="checkbox"/>
Barnet ville ikke	<input type="checkbox"/>	<input type="checkbox"/>
Barnet sykt/for tidlig født	<input type="checkbox"/>	<input type="checkbox"/>
Kolikk/urolig barn	<input type="checkbox"/>	<input type="checkbox"/>
Barnet biter/har fått tenner	<input type="checkbox"/>	<input type="checkbox"/>
For lite melk	<input type="checkbox"/>	<input type="checkbox"/>
Mor syk/medisinbruk	<input type="checkbox"/>	<input type="checkbox"/>
Bekymring/stress/sliten	<input type="checkbox"/>	<input type="checkbox"/>
Brystbetennelse	<input type="checkbox"/>	<input type="checkbox"/>
Tilstoppede melkeganger	<input type="checkbox"/>	<input type="checkbox"/>
Såre brystknopper	<input type="checkbox"/>	<input type="checkbox"/>
Brystoperert	<input type="checkbox"/>	<input type="checkbox"/>
Mor begynte å arbeide/å studere	<input type="checkbox"/>	<input type="checkbox"/>
Andre grunner	<input type="checkbox"/>	<input type="checkbox"/>
Ingen spesielle problemer, men ønsket ikke å amme lenger	<input type="checkbox"/>	<input type="checkbox"/>
Ble rådet til å slutte	<input type="checkbox"/>	<input type="checkbox"/>

Dersom mor ble rådet til å slutte å amme, hvem var det som rådet henne til det?
(F.eks helsepersonell, familie, venner)

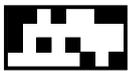
SPØRSMÅL OM MORSMELKERSTATNING/ANNEN MELK

11. Hvor gammelt var barnet da det begynte med morsmelkerstatning/annen melk i tillegg til eller istedenfor morsmelk?

Her regnes både det som drikkes og det som du selv tilsetter i grøt eller annen mat.

Sett ett kryss

Uker							Måneder								
1	2	3	4	5	6	7	2	2,5	3	3,5	4	4,5	5	5,5	6
<input type="checkbox"/>															



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12. Hvor ofte driker barnet vanligvis morsmelkerstatning/annen melk i tillegg til eller istedenfor morsmelk, og hvor mye driker barnet vanligvis pr. gang?

Se mengdeangivelse på bilde 1 bakerst i spørreskjemaet. Velg mengde A, B, C eller D. Sett kryss i ruten som er nærmest den mengden barnet vanligvis får pr. gang. Hvis mengden varierer mye fra måltid til måltid, prøv å anslå en gjennomsnittsmengde. 100 ml = 1 dl.

For hver melketype settes **ett kryss for hvor ofte, enten ganger pr. uke eller ganger pr. døgn**. I tillegg settes **ett kryss for hvor mye** barnet vanligvis driker pr. gang.

		Hvor ofte?							Hvor mye?			
		Ganger pr. uke		Ganger pr. døgn					Mengde (ml) pr. gang			
	Aldri/sjeldnere enn hver uke	1-3	4-6	1	2	3	4	5 el. flere	60 A	120 B	180 C	240 D
NAN 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NAN 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NAN H.A. 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collett med omega 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hipp økologisk morsmelkerstatning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Småfolk morsmelkerstatning med omega 3 og 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Småfolk morsmelkerstatning BabyPlus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holle morsmelkerstatning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holle tilskuddsblanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helmelk (søt og sur)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lettmelk (søt og sur)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ekstra lettmelk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skummetmelk (søt og sur)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kumelksblanding (kumelk-vann-sukker)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen melk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen morsmelkerstatning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Dersom du bruker annen morsmelkerstatning/annen melk, oppgi type:



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SPØRSMÅL OM FAST FØDE**13. Har barnet begynt å få fast føde?**

Sett ett kryss

 Ja Nei → *Gå til spørsmål 21***14. Hvor gammelt var barnet da det første gang fikk fast føde?**

Sett ett kryss

Uker							Måneder								
1	2	3	4	5	6	7	2	2,5	3	3,5	4	4,5	5	5,5	6
<input type="checkbox"/>															

15. Hvor ofte pleier barnet å spise følgende mat nå?

Med melk menes her morsmelk, morsmelkerstatning eller annen melk.

Sett ett kryss for hver matvare, **enten ganger pr. uke eller ganger pr. døgn**

	Aldri/sjeldnere enn hver uke	Ganger pr. uke		eller	Ganger pr. døgn			
		1-3	4-6		1	2	3	4 el. flere
INDUSTRIFREMSTILT GRØT/VELLING:								
Nestlé grøt tilberedt med melk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nestlé grøt tilberedt med vann	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nestlé velling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Småfolk grøt tilberedt med melk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Småfolk grøt tilberedt med vann	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hipp grøt tilberedt med vann	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hipp velling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holle grøt tilberedt med vann/melk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HJEMMELAGET GRØT:								
Grovt/sammalt mel/havregryn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hirse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fint/hvitt mel/kavring/semule/ris/mais	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INDUSTRIFREMSTILT MIDDAG PÅ GLASS:								
Kun grønnsaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kjøtt og grønnsaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fisk og grønnsaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HJEMMELAGET MIDDAG:								
Potet-/grønnsaksmos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kjøtt og grønnsaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fisk og grønnsaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annen hjemmelaget middag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





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16. Hvor ofte pleier barnet å spise følgende mat nå?*Sett ett kryss for hver matvare, enten ganger pr. uke eller ganger pr. døgn*

	Aldri/sjeldnere enn hver uke	Ganger pr. uke		Ganger pr. døgn			
		1-3	4-6	1	2	3	4 el. flere
FRUKT-/BÆRMOS:							
Industrifremstilt frukt-/bærmos på glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hjemmelaget frukt-/bærmos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ANNEN MAT:							
Brød	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kjeks/kaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spinat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Pleier barnet å få økologiske produkter?*Sett ett kryss for hver matvare*

	Ja, vanligvis	Ja, av og til	Nei, sjelden/aldri
Grøt/velling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frukt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grønnsaker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andre økologiske produkter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Hvor gammelt var barnet da det fikk følgende matvarer for første gang?*Sett ett kryss for hver matvare*

	Ikke fått	Måneder					
		1	2	3	4	5	6
Mais-/ris-/hirsegrøt	<input type="checkbox"/>						
Havre-/hvete-/bygg-/kavringgrøt	<input type="checkbox"/>						
Frukt-/bærmos	<input type="checkbox"/>						
Moset potet	<input type="checkbox"/>						
Moste grønnsaker	<input type="checkbox"/>						
Moset kjøtt	<input type="checkbox"/>						
Moset fisk	<input type="checkbox"/>						
Brød	<input type="checkbox"/>						
Yoghurt	<input type="checkbox"/>						



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19. Dersom barnet får grøt nå, hva slags væske tilsettes vanligvis grøten ved tilberedning/koking?

Hvis det vanligvis brukes mer enn én type væske, settes flere kryss

- Vann
- Morsmelk
- Morsmelkerstatning
- Kumelk
- Annet

20. Dersom barnet får grøt, hvor store porsjoner spiser barnet vanligvis til hvert måltid?

Se mengdeangivelse på bilde 2 bakerst i spørreskjemaet. Velg mengde A, B, C, D, E eller F. Sett kryss i ruten som er nærmest den mengden barnet vanligvis får pr. gang. Hvis mengden varierer mye fra måltid til måltid, prøv å anslå en gjennomsnittsmengde. Sett ett kryss for hver grøttype.

	Bruker ikke	Noen ts (Bilde A)	0,5 dl (Bilde B)	1 dl (Bilde C)	1,5 dl (Bilde D)	2 dl (Bilde E)	2,5 dl (Bilde F)
Industriefremstilt grøt	<input type="checkbox"/>						
Hjemmelaget grøt	<input type="checkbox"/>						

SPØRSMÅL OM VANN, SAFT, JUICE O.L.

21. Hvor ofte pleier barnet å drikke vann, saft, juice o.l., og hvor mye drikker barnet vanligvis pr. gang?

Se mengdeangivelse på bilde 1 bakerst i spørreskjemaet. Velg mengde A, B, C eller D. Sett kryss i ruten som er nærmest den mengden barnet vanligvis får pr. gang. Hvis mengden varierer mye fra gang til gang, prøv å anslå en gjennomsnittsmengde. 100 ml = 1 dl.

For hver drikk settes ett kryss for hvor ofte, enten ganger pr. uke eller ganger pr. døgn. I tillegg settes ett kryss for hvor mye barnet vanligvis drikker pr. gang.

		Hvor ofte?					Hvor mye?					
		Ganger pr. uke	eller		Ganger pr. døgn			Mengde (ml) pr. gang				
	Aldri/sjeldnere enn hver uke	1-3	4-6	1	2	3	4	5 el. flere	60 A	120 B	180 C	240 D
Vann	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saft for barn 0-3 år (Nestlé, Hipp o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saft, sukret	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saft, kunstig søtet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brus, sukret	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brus, kunstig søtet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Juice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nektar (eplenektar o.l.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nypeekstrakt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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22. Dersom barnet får vann nå, hvor gammelt var barnet da det begynte å få dette?*Sett ett kryss*

Uker							Måneder								
1	2	3	4	5	6	7	2	2,5	3	3,5	4	4,5	5	5,5	6
<input type="checkbox"/>															

23. Dersom barnet får saft, juice o.l. nå, hvor gammelt var barnet da det begynte å få dette?*Sett ett kryss*

Uker							Måneder								
1	2	3	4	5	6	7	2	2,5	3	3,5	4	4,5	5	5,5	6
<input type="checkbox"/>															

ANDRE SPØRSMÅL OM BARNETS KOSTHOLD**24. Er det noen matvarer det kunne være aktuelt å gi barnet, men som du unngår å gi fordi du er redd barnet kan reagere med allergi/intoleranse?***Sett ett kryss*

- Ja
- Nei \Rightarrow *Gå til spørsmål 26*

25. Hvilke matvarer/ingredienser i matvarer unngår du å gi barnet?*Her kan du sette flere kryss*

- Glutenholdig mel/korn (hvete, havre, rug og bygg)
- Vanlig kumelk
- Morsmelkerstatning
- Appelsin/appelsinjuice/annen sitrusfrukt
- Fisk/skalldyr
- Nøtter/nøtteprodukter (peanøttsmør etc.)
- Belgfrukter (erter, bønner etc.)
- Egg
- Soya
- Matvarer med tilsetningsstoffer
- Annet





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26. Har barnet hatt problemer i forhold til spising/mat?*Her kan du sette flere kryss*

- Nei, har ikke hatt noen problemer
-
- Ja, dårlig matlyst
-
- Ja, problemer med svelging/suging
-
- Ja, allergi/intoleranse mot enkelte matvarer
-
- Ja, andre problemer

Oppgi hvilke:

SPØRSMÅL OM KOSTTILSKUDD**27. Får barnet vitamin D-tilskudd (som vitamin D-dråper/tran) eller annet kosttilskudd nå?***Sett ett kryss*

- Ja
-
- Nei, men barnet har fått vitamin D-tilskudd/kosttilskudd tidligere ⇒ *Gå til spørsmål 29*
-
- Nei, barnet har aldri fått vitamin D-tilskudd/kosttilskudd ⇒ *Gå til spørsmål 31*

28. Hvor ofte får barnet vanligvis vitamin D-tilskudd eller annet kosttilskudd, og hvor mye får barnet pr. gang?*For hvert kosttilskudd settes ett kryss for hvor ofte, enten ganger pr. uke eller ganger pr. døgn. I tillegg settes ett kryss for hvor mye barnet vanligvis får pr. gang.**Det er satt opp to mengder for en teskje: 3 ml (liten teskje) og 5 ml (stor teskje)*

	Aldri/sjeldnere enn hver uke	Hvor ofte?				Hvor mye?					
		Ganger pr. uke	eller	Ganger pr. døgn	Mengde pr. gang	1 ts (3 ml)	1 ts (5 ml)	1 bs (7 ml)	1 ss (10 ml)	3 dråper	5 dråper
Tran	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vitamin D-dråper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andre typer fiskeoljer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Multivitaminer (Sana-sol, Biovit, Nycoplus multivitamin mikstur)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annet kosttilskudd	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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29. Hvor gammelt var barnet da det første gang fikk vitamin D-tilskudd?

Sett ett kryss

Uker							Måneder								
1	2	3	4	5	6	7	2	2,5	3	3,5	4	4,5	5	5,5	6
<input type="checkbox"/>															

30. Hvilke av følgende kosttilskudd har barnet fått de første levemånedene?Sett kryss for **alle** levemånedene barnet har fått kosttilskudd

	Levemåned						
	Ikke fått	1	2	3	4	5	6
Tran	<input type="checkbox"/>						
Vitamin D-dråper	<input type="checkbox"/>						
Andre typer fiskeoljer	<input type="checkbox"/>						
Multivitaminer (Sana-sol, Biovit, Nycoplus multivitamin mikstur)	<input type="checkbox"/>						
Annet kosttilskudd	<input type="checkbox"/>						

INFORMASJON OM SPEDBARNSENERING**31. Hvor har du fått informasjon om amming/spedbarnsernæring, og hvordan vurderer du denne informasjonen?**

Sett ett kryss for hver linje

	Ikke fått informasjon	Svært nyttig	Nyttig	Lite nyttig	Unyttig
Føde-/barselavdelingen	<input type="checkbox"/>				
Helsestasjonen	<input type="checkbox"/>				
Helsepersonell utenfor helsestasjonen	<input type="checkbox"/>				
Homøopat	<input type="checkbox"/>				
Familie/kjente	<input type="checkbox"/>				
Ammehjelpen	<input type="checkbox"/>				
Bøker og/eller oppslagsverk	<input type="checkbox"/>				
Aviser/TV/Ukeblad	<input type="checkbox"/>				
Reklamemateriell	<input type="checkbox"/>				
Butikken	<input type="checkbox"/>				
Mattilsynets hjemmeside (www.mattilsynet.no)	<input type="checkbox"/>				
Sosial- og helsedirektoratets hjemmeside (www.shdir.no)	<input type="checkbox"/>				
www.matportalen.no	<input type="checkbox"/>				
Andre internettsider	<input type="checkbox"/>				
Annet	<input type="checkbox"/>				



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32. Har du fått/sett informasjonsmateriellet nevnt nedenfor, og hvordan vurderer du eventuelt dette materiellet?

Sett ett kryss for hver linje

	Ikke fått/sett	Svært nyttig	Nyttig	Lite nyttig	Unyttig
Brosjyren 'Mat for spedbarn'	<input type="checkbox"/>				
Brosjyren 'Hvordan du ammer ditt barn'	<input type="checkbox"/>				
Filmen 'Bryst er best'	<input type="checkbox"/>				

33. Ønsker du mer informasjon om spedbarnsernæring?

Sett ett kryss

- Ja
- Nei \Rightarrow *Gå til spørsmål 35*
- Vet ikke \Rightarrow *Gå til spørsmål 35*

34. Hvilke tema(er) er det du særlig ønsker mer informasjon om i forhold til spedbarnsernæring?

Her kan du sette flere kryss.

(Dersom det ikke er plass til alle ønsker i det åpne feltet, skriv inn det du synes er viktigst)

- Amming
- Bruk av morsmelkerstatning/annen melk enn morsmelk
- Tidspunkt for når barnet skal begynne med fast føde
- Hjemmelaget spedbarnsmat/hvordan lage spedbarnsmaten selv
- Vitamin D-tilskudd/kosttilskudd
- Valg av grøttypen
- Matvareallergi/-intoleranse
- Andre tema;

Oppgi hvilke:





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BAKGRUNNSSPØRSMÅL OM BARNETS MOR OG FAR

35. Hva er mors alder?

Skriv inn mors alder

		År
--	--	----

36. Hvilken utdanning har barnets mor og far?

Sett ett kryss for høyeste fullførte utdanning hos mor og ett kryss for høyeste fullførte utdanning hos far

	Barnets mor	Barnets far
9/10-årig grunnskole eller kortere	<input type="checkbox"/>	<input type="checkbox"/>
9/10-årig grunnskole og folkehøgskole eller annen ett-årig utdanning	<input type="checkbox"/>	<input type="checkbox"/>
Videregående opplæring (gymnas/fagbrev)	<input type="checkbox"/>	<input type="checkbox"/>
Fagskoleutdanning	<input type="checkbox"/>	<input type="checkbox"/>
Høgskole- eller universitetsutdanning på 4 år eller mindre	<input type="checkbox"/>	<input type="checkbox"/>
Høgskole- eller universitetsutdanning på mer enn 4 år	<input type="checkbox"/>	<input type="checkbox"/>
Annet	<input type="checkbox"/>	<input type="checkbox"/>
Vet ikke	<input type="checkbox"/>	<input type="checkbox"/>

37. Hvordan var mors arbeidssituasjon før barnet ble født?

Sykemeldinger i forbindelse med svangerskapet skal ikke regnes med. Dersom flere alternativer passer, kryss av for det alternativet som passer best.

Sett ett kryss

- Utearbeidende heltid
- Utearbeidende deltid
- Hjemmearbeidende
- Sykemeldt før hun ble gravid
- Permisjon
- Uføretrygdet
- Under attføring
- Student/skoleelev
- Arbeidsledig
- Annet

38. Hvordan er mors familiesituasjon?

Sett ett kryss

- Samboer
- Gift
- Bor alene med barnet/barna
- Annet





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39. Røykte mor i svangerskapet?

Sett ett kryss

- Nei
-
- Ja, men sluttet i 1. trimester (uke 1-12)
-
- Ja, men sluttet i 2. trimester (uke 13-24)
-
- Ja, men sluttet i 3. trimester (uke 25 frem til fødsel)
-
- Ja, av og til (ikke hver dag)
-
- Ja, 1-9 sigaretter pr. dag
-
- Ja, 10 sigaretter eller flere pr. dag

40. Røyker mor nå?

Sett ett kryss

- Nei
-
- Ja, av og til (ikke hver dag)
-
- Ja, 1-9 sigaretter pr. dag
-
- Ja, 10 sigaretter eller flere pr. dag

41. Oppholder barnet seg i rom hvor noen røyker?

Sett ett kryss

- Nei
-
- Ja, av og til
-
- Ja, flere ganger i uken
-
- Ja, daglig

42. Har barnets foreldre eller søsken astma/allergi, eller har de hatt slike plager tidligere?

Her kan du sette flere kryss

- Nei
-
- Mor har/har hatt astma/allergi
-
- Far har/har hatt astma/allergi
-
- Barnets søsken har/har hatt astma/allergi

Tusen takk for at du tok deg tid til å besvare spørsmålene!

Skjemaet legges i vedlagte svarkonvolutt, men vent med å lime den igjen og sende inn til barnets vekt og lengde er ført inn på skjemaet.



Appendix 2