Breastfeeding duration is determined by only a few factors

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Background: According to a representative German study prepared between 1996 and 1998 (SuSe-Study) 90% of the mothers were willing to breastfeed, but only 33% (10%) of the babies were exclusively breastfed up to 4 (6) months of age. Bearing in mind that the period currently recommended for breastfeeding is 6 months, this discrepancy highlights the need for action to identify the causes. The present study investigates the behaviour pattern of mothers 4-5 months after delivery. Methods: The investigation was carried out as a cross-sectional study of mothers who intended to breastfeed their babies (n = 52). All mothers delivered in a hospital, with maximum medical care, and were interviewed later by telephone using a semi-standardised questionnaire. The differences between actual breastfeeding mothers (BF, n = 30) and non-breastfeeding mothers (not BF, n = 22) were identified. The factors influencing decision-making were determined. Results: Significant differences between the two groups tested (BF and not BF) were identified as the perception of the simplicity of breastfeeding, planned pregnancy, marital status, as well as participation at birth preparation classes. If only factors known prior to birth are applied, the decision to breastfeed can be correctly forecast as being 81%. Conclusion: In order to allocate consulting resources more effectively, appropriate concepts need to be developed and promoted. If the present results could be verified by a study with a larger sample, the practical use for resource optimisation in breastfeeding consultations would be very beneficial.

Keywords: breastfeeding, influencing factors, outcome prognosis, resource allocation

Introduction

Germany had an infant mortality rate of over 25% one hundred years ago. At that time breastfeeding was the best insurance of child survival; however, nowadays there are no proven significant differences in infant mortality between breastfed and non-breastfed children in Germany. Nevertheless there are differences in morbidity with regard to allergies, infections, diarrhoea, incidence of nosocomial sepsis, as well as other illnesses. In Germany these facts have received only little interest, although cost-benefit analyses show a positive balance. The cost saving calculated in the studies amounts to between $200 and $475 in only the first year for children who were breastfed for at least 6 months. Kaiser Permanente—the largest US-American Health Maintenance Organization (HMO)—determined a cost saving of $1435 for the second to sixth year of life in children who were breastfed for 6 months. In a cohort study in the USA, family-related savings of $808 were calculated for the first 3 years of life.

Regarding the mothers’ health, information collected in a meta-analysis of breast cancer in several countries shows that the risk of breast cancer drops in relation to the length of time a woman breastfeeds. In addition other indicators, such as maternal stress response and maternal post-partum weight loss, are positively influenced. An overview is given by Gartner et al. With respect to the reduced risk of breast cancer as a result of breastfeeding, the meta-study mentioned above shows that the risk decreases by 4.3% for every year that the woman breastfed. Based on the results of the meta-analysis, the German Nutrition Society has calculated that by extending the period of breastfeeding on average by 6 months, with the number of children being born remaining stable in Germany, 2000 new cases of breast cancer could be avoided per year. This shows that breastfeeding is ideal in every aspect for the first 6 months of a child’s life.

Approximately 50 years ago the first breast milk substitutes that were similar to mother’s milk were developed. In the 1970s this development reached its highest peak and threatened to replace the natural nutrition of infants. Even in today’s society, opinions and recommendations about infant nutrition are governed not only by scientific factors, but also by strong cultural influences, trends, societal morals, and, more than ever, advertisements for baby food. In the light of the body of literature, individual views, practicability and resources, as well as professional support play an important role.

The World Health Organisation (WHO) and the United Nations Children’s Fund (UNICEF) recommend that all mothers should breastfeed their children exclusively for the first 6 months. Thereafter they should continue to breastfeed for as long as the mother and child wish, and both appropriate and sufficient weaning food should be added. However, the WHO estimates that worldwide only 35% of children between birth and their fifth month are breastfed exclusively (WHO, 1998, S. 70). In Germany in the year 1997/98 the number of mothers willing to breastfeed was 90%, but only 33% (10%) of the children were breastfed exclusively for more than 4 (6) months. In view of this discrepancy between the intention to breastfeed and actual breastfeeding, the inarguable advantages of breastfeeding clearly show a great need for action with regard to cause an analysis as well as to develop appropriate concepts, and if necessary to promote the existing ones. By this study we would like to investigate indicators for extending the duration of breastfeeding in order to be able to focus the resources available.
Study design and methods

The only factor that prevented participation in this study was insufficient command of the German language. From 12 July 2001 to 14 September 2001, 71 women who gave birth and were primarily willing to breastfeed were addressed individually, 1–3 days after their delivery at the participating OB-GYN clinic. Of these women 70 were willing to participate. Data collection took place between November 2001 and January 2002, i.e. 4–5 months after giving birth. Of the women 74% (n = 52, range: 16–40 years, mean age: 30 years) were successfully contacted and questioned, and 90% of these participants were German nationals and 94% lived in or near the same city as the OB-GYN clinic. Of the participants 46% were primiparous, 44% had one child, and 10% had two children. Fifty-one participants were interviewed by telephone and one participant face-to-face. Two of the participants delivered twins. All interviews were carried out by one researcher and lasted between 25 and 60 min, the average time being 45 min.

The questionnaire was developed in such a way that the questions could either be answered in a straight-forward way or be expanded on in order to obtain responses outside the preformed scope. The study was set up in such away that 4–5 months after delivery a comparison between the group that still breastfed (BF: exclusively breastfed; mother’s milk and weaning foods; mother’s milk, formula, and weaning food) and the group that no longer breastfed (not BF: formula; formula and weaning food, and/or other foods) could be made (figure 1).

The questionnaire was divided into four major sections (child, mother, clinic stay, and breastfeeding) and tried to discover the mother’s contentment, support potential, and motivation, as well as the commitment of the father/partner. However the main focus was to ascertain the real level of knowledge about breastfeeding and the difficulties therein. With the help of filters and branch questions, the questionnaire was modified based on a pre-test drawn up for a 30 min interview format. The questions allowed the responses to be entered mainly on nominal and ordinal scales, seldom on interval and relationship scales.

The quantitative and qualitative data that were gathered were quantified as far as possible within the framework of the data processing, and were evaluated using the SPSS and MedCal computer programs. Methods such as descriptive (measure of central tendency) and analytical statistics (logistic regression and artificial neural network) were applied. In order to reasonably reduce the number of independent variables, only those variables were used in the analysis that correlated with the goal variable at least initially (absolute value of the correlations coefficient >0.3), or which were of special interest based on earlier work. Using the help of logistic regression it was investigated to what extent prognoses about later breastfeeding habits could be made before birth. An artificial neural network was implemented for the same purpose because this method has proven advantageous when dealing with non-linear relationships. Therefore the prototype software ACMD was used, for background information. The Chi-squared test and Fisher’s exact test were used with a significance level of 0.05.

Results

Characterisation of mothers and children

With regard to age, education, profession, and the number of children already born before the current pregnancy, there were no significant differences between the group of mothers who were still breastfeeding 4–5 months after birth (BF, n = 30) and the group of mothers who no longer breastfed at this time (not BF, n = 22). At the time of the interview all mothers were still on long-term maternity leave. Mothers who no longer breastfed mentioned significantly more often that they were satisfied with the present situation (P = 0.024).

65% of the mothers knew that scientific research has recommended exclusive breastfeeding for a child for at least 6 months.
Respondents who were aware of this tended to breastfeed their child more often at the time of the interview ($P = 0.067$). One-fourth of the women assumed 4 months were sufficient, and 10% thought the recommended time was more than 6 months. Advantages such as quicker involution of the uterus, easier weight loss, and long-term health benefits were completely unknown.

Of the children 39% was female and 61% was male, 13% of the infants was born prematurely. There were no significant differences between the breastfeeding habits of mothers with boys and girls ($P = 0.984$) or with premature and mature infants ($P = 0.539$). Of all the babies 73% were planned. These children were breastfed significantly more than children who were not planned ($P = 0.013$).

**Infant nutrition in the fourth and fifth month**

Two weeks after delivery 8% of the mothers had stopped breastfeeding, 2 months after birth one-third (27%) had stopped. At the time of the interview 22 (42%) out of a total of 52 mothers had stopped breastfeeding. Figure 1 shows the frequency of the chosen form of nutrition.

**Characterisation of the family situation**

At the time of questioning 90% of the women were married (67%) or lived in a marriage-like partnership (23%). In the BF group significantly more women were married. ($P = 0.048$). The breastfeeding habits in both groups were independent of income and the number of children living in the same house. Having a role model or previous experience with breastfeeding did not show any significant difference either ($P = 0.271$). However, moving house due to the birth of the child was highly significant with mothers who breastfed for only a short time ($P < 0.001$). In the first few weeks 73% of the mothers received support at home from medical personnel and additionally from family members—in 60% of the cases the partner and in 37% the grandmother. Friends, both male and female, played no role. Almost one-third received no help. While mothers who no longer breastfed felt that they were supported (BF 26%, not BF 50%), mothers who breastfed felt they only received moderate support (BF 47%, not BF 30%).

**Birth preparation**

All pregnancies, with the exception of one, were confirmed by a gynaecologist within the first trimester. On an average 12 maternity check-up appointments were made (range: 8–26). According to information given by the participants, the majority of the gynaecologists did not discuss the topic of ‘breastfeeding’ with them (83%) and did not examine their breasts (81%); no significant differences were made between BF and not BF). Of all 31 participants (60%) took part in birth preparation and/or infant care courses (primapara: 15/24, secundipara: 15/23, and tertiapara: 1/5). In the BF group significantly more women participated in birth preparation courses ($P = 0.041$).

Over half of the mothers (58%) had decided to breastfeed before they became pregnant, 37% decided how they would feed their child during their pregnancy, and 6% decided after giving birth.

Participants who thought breastfeeding would be easier than processed infant formula were found significantly more among the group that was still breastfeeding after 4–5 months ($P = 0.006$). Of the participants 65% claimed to have been breastfed by their own mother, 25% had not been breastfed, and the remaining 10% did not know. Mothers who were breastfed as infants did not breastfeed their child more than the mothers who were not breastfed as infants ($P = 0.114$).

**Clinic stay**

Of the women 85% wanted to give birth at the clinic where recruitment for this study took place. Of the fathers 87% were present at the birth of their children in the delivery room. For 11% there was another person having close ties, who was with them. Of the children 56% were born spontaneously, 4% needed forceps, and 40% via caesarean. There were no significant differences between the methods of birth, the duration of hospitalisation, or the medication. The same applies to the emotional status, which was viewed overwhelmingly in a positive way at the time of the interview.

Half of the participants first breastfed their child in the delivery room. With regard to breastfeeding habits at the end of the fourth month, there was no significant difference, but there was a strong trend ($P = 0.095$) between mothers who first breastfed their children in the delivery room and those who belonged to the BF group. Only 15 of the 26 mothers who breastfed their child in the delivery room received help from a midwife.

One-fourth of the participants wished they had fewer visitors during their clinical stay. Almost all would have liked the food to have been more appropriate for breastfeeding mothers—even though a special diet for breastfeeding is no longer recommended. When asked what they would have liked to improve during their stay in the maternity ward, results showed that the largest difference between the groups was for more time to breastfeed (BF 6%, not BF 23%) ($P = 0.119$) and to have an environment which was more conducive to breastfeeding. (BF 30%, not BF 9%) ($P = 0.092$).

Some participants claimed that when breastfeeding attempts had not been successful within a short period of time, mediation to stop lactation was given too quickly, or they were advised to give supplementary nutrition, or the infant was given glucose without any explanation to the mother.

**Breastfeeding habits**

No significant difference could be determined between the BF and not BF groups in how often or for how long a child was breastfed. The tendency, however, was that mothers in the BF group fed their infants more than six times a day in the first 2 weeks ($P = 0.098$). Twelve women (23%) said that their children had problems with sucking at least once. Sucking problems were not mentioned as being the reason for stopping breastfeeding. Of the mothers 37% gave complications or difficulties as their reason. Of these mothers 29% complained about sore nipples, 19% about pain, 12% about having too much milk, and 27% about various other difficulties. It should be pointed out that the ones who no longer breastfed did not mention any more problems than the group that was still breastfeeding ($P = 0.759$).

Of the women who had stopped breastfeeding 95% gave ‘not enough milk’ as the main reason, eight women (35%) indicated ‘other children’ or ‘too much stress’ as to why they no longer breastfed.

In their efforts to breastfeeding their children successfully the young mothers tried various measures. It was important for ~50–70% of the women to let their children breastfeed often, to drink enough fluids, to provide a calm environment, and to drink a herbal tea, which supports lactation. The women who were still breastfeeding tended to adjust their own drinking needs to the changed requirements ($P = 0.092$).

Processed foods were given by 5 mothers (10%) within the first 2 weeks, 11 mothers (21%) within the 9th and 16th week, and 18 mothers (35%) gave their children only their own milk.

Free sample packages of processed baby food were received by a total of 29 mothers (56%) at the time when the interviews took place. The samples were sent to the mothers by the manufacturers normally in the fourth month after birth.
Of the participants 67% answered to have been praised for the care of their child within the last 4 months, 33% felt vice versa. Mothers who did not breastfeed 4 months after giving birth mentioned significantly more often that they received praise and recognition ($P = 0.017$), i.e. breastfeeding mothers felt they received less praise.

More than 60% of the women felt that no one encouraged them to breastfeed. Only every sixth mother received encouragement from midwives, family, and partner, and people within the healthcare system played almost no role (figure 2).

**Multivariate analysis**

After performing the comprehensive description the surveyed data were analysed by multivariate approaches. Values of the dependent variable (= explained variable: mother does or does not breastfeed) were predicted through the means of logistic regression and artificial neural network from the values of other independent variables. The logistic regression was accurate for a total of 90%. That means in 90% of the cases there was a direct correlation between predicted and observed breastfeeding habits [sensitivity: 93% (28/30) and specificity: 86% (19/22)]. If one restricts the logistic regression to those variables, whose attributes are known before delivery, then the accuracy is 81% [sensitivity: 93% (28/30) and specificity: 64% (14/22)]. The artificial neural network also predicts with the same accuracy.

That means with only four variables (the mother is married, did not move due to the birth of the child, the mother attended a birth preparation course and/or an infant care course, and had a planned pregnancy) the outcome of whether a mother will still breastfeed her child or not 4 months after delivery can be correctly predicted, with a probability of 80%.

**Discussion**

The immediate willingness of the participating clinic to make these interviews possible, the high percentage of participation, and, last but not least, the results of this study show the great interest in and the need for a scientific investigation into the topic of ‘breastfeeding’.

As the interviews were carried out within a representative sample of patients from one clinic with maximum medical care by means of a semi-standardised questionnaire and by only one interviewer, a minor distortion can be assumed. However, the results need to be interpreted carefully due to the small sample group ($n = 52$).

The sociodemographic characteristics of the participants correspond with those in the SuSe-Study and with the population averages in Germany, according to the Federal Statistical Office. The percentage determined in this study (35%) for mothers who were still exclusively breastfeeding 4 months after delivery are confirmed in the SuSe-Study (33%). Likewise the percentage of mothers still breastfeeding at this time was 58% and comparable (SuSe-Study 59%). This trend, that describes significant results with regard to positive influences for breastfeeding mothers, is also confirmed by the body of literature.31–34 These influences include higher education, vaginal birth, breastfeeding early and often, and no complication with breastfeeding. In this sample there was a 40% rate of caesareans so that the first time a child could be breastfed was often delayed. The reason for this relatively high rate of caesareans was due to the fact that the participating OB-GYN clinic was a perinatal centre with maximum medical care. Indeed 95% of the children achieved the maximum APGAR value, indicating good health. Thus—except for the rate of caesareans—the study sample may be considered representative for the German population of women giving birth.

Favourable components for increasing the duration of breastfeeding appear to be the support from a freelance midwife after the mother has left the clinic as well as the mother adjusting her own drinking needs.

With regard to other factors described in this paper, such as income, early breastfeeding, the sex of the child, and the type of birth, there were no significant differences. Interestingly enough women who no longer breastfed felt they had more support than the ones who still were. Research shows that support from the

![Figure 2](image-url)

**Figure 2** People who encouraged breastfeeding from the mother’s point of view (multiple answers possible)
partner and others play an underestimated role in long-term breastfeeding.  

In Germany the percentage of mothers who wish to breastfeed their children primarily is 90%, however, only 33% (10%) of the children were exclusively breastfed for more than 4 (6) months. In 1994 Switzerland had about the same ratio and Italy did in 1995. Far higher rates of breastfeeding are achieved in Scandinavia, where in Sweden in 1997 for example, 55% of the infants were exclusively breastfed for 6 months and in total 75% were breastfed. A Europe-wide survey is given by Cattaneo et al., which shows that it is possible to have a high rate of and long-term (6 month) breastfeeding in industrialised nations. Possible positive influences found in the present study:  

- Planned pregnancy  
- Married mother  
- Participation in a birth and/or an infant care course  
- Awareness of breastfeeding recommendations  
- Breastfeeding perceived as being easy.

Especially the perception that breastfeeding is simple plays a significant part between the group that is still breastfeeding (BF) and the group that is no longer breastfeeding (not BF). The main reason given for discontinuing breastfeeding was lack of milk. The statements mentioned above clearly show the need for relevant information, adequate consulting and increasing parental competency, as mothers who are well informed breastfed their children significantly longer. At the same time the positive benefits for mothers who breastfed should be specifically announced.

It is clear that more needs to be done to propagate the practice of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code for marketing infant formula and also a WHO resolution which the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be criticised. There is an international code of breastfeeding, although it must be pointed out that some of the parties deserve to be critically. 

References


Received 15 December 2004, accepted 30 August 2005