

Low rates of exclusive breastfeeding are still evident in four South African provinces

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Abstract

Objectives: Breastfeeding is one of the primary strategies used to enhance infant nutrition and improving child survival worldwide. The intention of globally increasing the rate of exclusive breastfeeding (EBF) to at least 50% of infants in the first six months of life was stated in the 2014 International Conference on Nutrition Rome Declaration on Nutrition and the Post-2015 Development Agenda. This study aimed to explore the infant-feeding practices of mothers and caregivers of infants aged ≤ 6 months in four provinces in South Africa.

Setting and subjects: This cross-sectional study was conducted in four provinces in South Africa. In total, 40 health facilities were randomly selected in the four provinces and visited, including metropolitan and non-metropolitan health facilities over the geographical area of the provinces. The sample size comprised mothers and/or caregivers of babies aged ≤ 6 months.

Design: Fixed-format interviews were used in this cross-sectional study on 580 mothers and/or caregivers. The mothers completed 24-hour recall based on the Food and Agriculture Organization of the United Nations dietary diversity list, consisting of 12 different food groups, to assess dietary intake and diversity.

Results: The EBF rate for infants up to the age of six months was 12%. Mothers who delivered full-term babies were most likely to initiate breastfeeding within the first hour of delivery. More than a third of the mothers had ceased breastfeeding by one month (40%, $n = 23$). The introduction of complementary food took place in 17% of infants during this first month. The minimum standards of dietary diversity were met by one infant only. Different reasons found to influence mothers' feeding practices included needing to return to work (29%) or their studies (12%), the mothers' health status (25%), and perceptions of an "insufficient" milk supply (13%).

Conclusion: Therefore, new strategies should address these gaps in knowledge with key breastfeeding awareness messages and a special focus on community involvement and participation. There is also a need for the whole nutrition fraternity, including government, academia and development industries, to intervene by developing more innovative approaches to increase the rate of EBF in South Africa.

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Introduction

Breastfeeding is a primary strategy used to enhance infant nutrition¹ and to improve child survival² worldwide. The World Health Organization (WHO) recommends that mothers should practise exclusive breastfeeding (EBF) for the first six months of the infant's life, with the timely introduction of complementary food thereafter, and continued supplementary breastfeeding for up to two years and beyond.^{3,4} South Africa supports this recommendation, as shown by the resolution of the 2011 Tshwane declaration for the support of breastfeeding.⁴ Complementary food should be introduced once an infant reaches the age of six months when breast milk no longer meets the infant's evolving nutritional requirements. The WHO also recommends breastfeeding on demand, i.e. as often as the child wants, during the day and night.

While EBF is an uncommon practice in South Africa for the entire first six months,^{2,5} the country has been shown to have very high breastfeeding initiation rates (75-97%).⁶ However, it appears that this is not maintained, as the 1998 and 2003 South African Demographic and Health Surveys showed that only 10% and 12% of infants aged 0-3 months, respectively, were exclusively breastfed, while EBF was even lower in infants aged 4-6 months (1% and 2%, respectively).² Very low cumulative EBF rates of 7% at 0-5 months (1998) and 8% at 0-6 months (2003) were also reported in both surveys. In 2008, Shisana et al⁷ reported that the cumulative EBF rate for the first six months had increased to 26% in South Africa. The cumulative EBF rate could be referred to as the "prevalence" indicator, i.e. the percentage of all children aged ≤ 6 months who are exclusively breastfed at a point in time. This would commonly yield a higher

percentage than a more direct indicator of duration, and could easily be misunderstood, thereby exaggerating the amount of EBF being practised.⁸ These EBF rates decreased in 2012. However, according to the South African National Health and Nutrition Examination Survey (SANHANES-1), only 7% of children aged ≤ 6 months were exclusively breastfed.⁹

Furthermore, the early introduction of supplementary feeds⁵ and mixed feeding² are the most common infant-feeding practices in South Africa. In 2014, according to the SANHANES-1 survey,⁹ the average age for the introduction of solid food in the country was 4.5 months. In addition, more than two thirds (64%) of children were given solid or semi-solid food before the age of six months.⁹ Both of these feeding practices carry a high risk of infections,¹⁰ diarrhoea¹¹ and malnutrition,² as well as reducing the amount of breast milk consumed by infants.⁵

Despite efforts to improve infant and young child feeding, a mother's selection of appropriate feeding practices is greatly influenced by various spheres of life, including the support provided by formal health services and other community-based groups,^{1,12} the mother's attitude towards and perception of breastfeeding and its nutritional value, as well as the satiety of the infant.^{1,5} Levels of appropriate feeding practices have also declined in many other parts of the

world, including other low-middle income countries.⁶ These feeding practices are dependent upon a vast number of economic, social and cultural factors.^{6,10,13} However, there is limited information on how these choices are made in South Africa. Accordingly, this research was carried out as an update on the current EBF rates and feeding practices of mothers in four provinces of South Africa. The data could also be used to monitor breastfeeding rates in the country.

A summary of exclusive breastfeeding data and the age of introduction of complementary food in South Africa, as recorded in different areas since 2003, is presented in Table 1.

The high prevalence of human immunodeficiency virus (HIV) in the different populations of mothers within the South African context was another complicating factor. Therefore, in 2010, the WHO revised its infant-feeding guidelines in the context of HIV, and recommended that HIV-positive mothers should exclusively breastfeed their infants while receiving antiretroviral treatment for mothers, or prophylaxis for their infants.²⁴ The WHO also recommends that HIV-infected mothers should completely avoid breastfeeding only if replacement feeding is acceptable, feasible, affordable, sustainable and safe.^{3,24}

In a pledge to reduce mortality in children aged ≤ 5 years, the intended outcome of the 2014 International Conference on Nutrition Rome Declaration on Nutrition and the Post-2015 Development

Table 1: A summary of exclusive breastfeeding rates in South Africa

Reference	Year*	Area	Sample size (n)	Population and context	EBF up to six months (%)	Age at which solids were introduced
Kruger and Gericke ¹⁴	2003	Pretoria	144	Mothers and caregivers	Rarely practised	2-3 months
				Children aged ≤ 36 months		
Mamabolo et al ⁵	2004	Limpopo	276	Mothers at randomly selected clinics	4.1	1 month
MacIntyre et al ¹⁵	2005	Gauteng	150	Mothers attending a postnatal clinic	4.6 (9 weeks)**	5 weeks
SADHS ¹⁶	2007	South Africa	2120	Nationally representative sample	8.0	< 2 months
Faber and Benadé ¹⁷	2007	KwaZulu-Natal	505	Mothers and caregivers in a rural area in KwaZulu-Natal	11.0 (4 months)	3.3 months
Mushapi et al ¹⁰	2008	Limpopo	185	Mothers at randomly selected clinics	7.6**	2 months
UNICEF ¹⁸	2008	South Africa	National	Nationally representative sample	7.0***	Not reported
Shisana et al ⁷	2010	South Africa	508	People of all ages living in South African households	25.7	Birth
Ladzani et al ¹⁹	2010	Mpumalanga	815	HIV-positive women at randomly selected clinics	35.6**	3 months
Goga et al ²⁰	2012	PMTCT sites	783	Mothers at purposively selected PMTCT sites	16.0	3 weeks
Van der Merwe ²¹	2012	Eastern Cape	218	Mothers attending a postnatal clinic	35.7	45 days
Shisana ⁹	2013	South Africa	243	Individuals of all ages living in South Africa	7.0	3 months
Kassier and Veldman ¹²	2013	Free State	189	Mothers and caregivers at randomly selected households	Not reported	2 months
Osborne ²²	2013	Eastern Cape	43	Mothers and grandmothers at two selected rural villages	2.0**	1 month
Goosen et al ²³	2014	Western Cape	140	Primary caregivers from randomly selected households	6.0**	3 months

EBF: exclusive breastfeeding, HIV: human immunodeficiency virus, PMTCT: prevention of mother-to-child transmission of HIV, SADHS: South African Demographic and Health Survey, UNICEF: United Nations Children's Fund

* Of publication

** The exclusive breastfeeding calculation included all of the infants in the study

*** Data refer to years other than those specified in the column heading

Agenda is to increase the rate of EBF in the first six months up to at least 50%.

Method

Research setting and study population

This was a cross-sectional descriptive study, which was part of a larger study in which violations of the International Code of Marketing of Breast-milk Substitutes in four provinces in South Africa were explored. The target population included mothers and/or caregivers of infants aged 0-6 months, as well as pregnant women at selected health facilities in four provinces (North West, Gauteng, Free State and Eastern Cape). A random sample of 8-12 health facilities was drawn from each of the four provinces. Health facilities were ranked according to the size of the facility, and by district and subdistrict. Only facilities in which more than 7 500 antenatal and postnatal visits were recorded in 2011 were considered to be large enough for inclusion. In total, 40 health facilities were randomly selected and visited in the four provinces, including metropolitan and non-metropolitan health facilities across the geographical area of each province. Eight facilities each were selected from two provinces (North West and Free State), and 12 facilities each from the other two provinces (Gauteng and Eastern Cape) because of the higher number of clinics in these provinces. The target sample for the larger study was at least 20 pregnant women, mothers and/or caregivers of infants aged ≤ 6 months per health facility (a total of 800 participants). The research was conducted and the data collected between May and November 2013.

To investigate EBF rates in this study, the target population consisted only of mothers and/or caregivers ($n = 580$), but not pregnant women. Therefore, the term "mothers" will be used in this paper to refer to the target population.

Study sample

On arrival at each of the 40 selected health facilities, the first 20 participants who met the inclusion criteria and gave informed consent to take part were enrolled to be interviewed. The use of convenience sampling within each facility was necessitated owing to practical considerations, such as the days on which mothers with infants visited the clinic, as well as the distances between the facilities. If 20 participants were not recruited at the selected health facility, sampling was carried out in two alternative clinics in close proximity.

Data collection tools

Data collection and fieldwork were completed by the core study team, including individuals with appropriate local language skills. Data were collected using a standardised questionnaire for the mothers of infants aged ≤ 6 months. Piloting was conducted before the start of the main study at a health facility in North West province which was not included in the main study in order to adapt and enhance the research tools in preparation for the study, and to test the procedures at health facility level. Fieldworkers were trained on the use of the questionnaires and interviewing prior to data collection in the field.

Each member of the team was fluent in English and at least one of the two languages most widely spoken in the province. As there are 11 official languages, only two of the predominant languages in each of the provinces were used.

A fixed-structured interview was conducted with each participant in her preferred language. The questionnaire included both open- and closed-ended questions. Dietary intake and diversity were assessed through completion by the mothers of 24-hour recall, based on the Food and Agriculture Organization of the United Nations (FAO) dietary diversity list, consisting of 12 different food groups.²⁵ The list was adapted to include local foods and food traditionally consumed in the four provinces.

Data analysis

Epi Info™ version 7.6 was used for data entry. Double-data entry was employed to ensure data quality. Prior to analysis, data were checked for missing values and inconsistencies, and cleaned to ensure quality and consistency. Qualitative data were grouped into various themes and coded before analysis.

Statistical analysis was carried out using SPSS® version 21.0. Descriptive statistics and frequencies were used. Cross-tabulations and Pearson's chi-square test were used to assess the relationship between groups. The level of statistical significance was set at a p-value of less than 0.050. Odds ratios were calculated from the frequency tables. Dietary intake and diversity were assessed and analysed according to the FAO dietary diversity list. The infants' ages were recorded in weeks. The data were then recoded into months. The age category of one month was infants aged 1-4 weeks; the category of two months, infants aged 5-8 weeks; three months, infants aged 9-12 weeks; four months, infants aged 13-16 weeks; five months, infants aged 17-20 weeks; and six months, infants aged 21-24 weeks. The six-month EBF rate was calculated using the following formula:

$$\text{Six-month EBF rate} = \frac{\text{infants (in their sixth month of life) who received only breast milk the previous day}}{\text{Total number of infants (six months old)}}$$

Ethical approval

The Human Research Ethics Committee of North-West University approved the research protocol (Ethics Number NWU-00008-13-A1). Written informed consent forms were signed by the participants after they had been verbally informed of the purpose of the research. Confidentiality was ensured by not asking for participants' names or any other identification. Participants were required to sign an informed consent form before participating in the study. The National Department of Health gave permission for the research, informed the provinces of the survey, and requested their cooperation. Access to the individual facilities was secured by the research team.

Results

The health facilities that were included, and the total number of mothers interviewed, for the study, are listed in Table II.

Table II: Participant representation per selected health facility

Province	District	Facility	Total number of mothers (n = 580)
North West (n = 138)	1	1	5
		2	5
	2	3	29
		4	13
		5	3
	3	6	5
		7	3
		8	22
		9	13
Free State (n = 175)	4	10	13
	5	11	23
		12	16
		13	25
	6	14	2
		15	11
		16	15
17		15	
Gauteng (n = 250)	7	18	13
		19	44
	8	20	12
		21	17
		22	15
		23	7
		24	10
	9	25	15
		26	28
		27	15
28		10	
Eastern Cape (n = 332)	11	29	20
		30	9
		31	19
		32	19
		33	13
	12	34	20
		35	23
	13	36	6
		37	15
		38	12
39		6	
40		14	
Total number of participants			580

Table III: Socio-demographic characteristics and exclusive breastfeeding rates at the time of the study

Characteristics	Total, n (%)	EBF,* n (%)	Non-EBF,** n (%)
Place of birth			
Hospital	419 (72)	185 (44)	234 (56)
Clinic	140 (24)	72 (51)	68 (49)
Home	21 (4)	9 (43)	12 (57)
Type of delivery			
Vaginal	440 (76)	197 (45)	243 (55)
Caesarean	125 (22)	65 (51)	60 (49)
Complications***	15 (3)	4 (27)	11 (73)
Relationship to infant			
Mother	551 (95)	266 (48)	285 (52)
Caregiver	29 (5)	0 (0)	29 (100)
Age distribution			
1 month	81 (14)	75 (93)	6 (7)
2 months	159 (27)	98 (62)	61 (38)
3 months	107 (19)	56 (52)	51 (48)
4 months	62 (11)	21 (34)	41 (66)
5 months	46 (8)	11 (24)	35 (76)
6 months	34 (6)	4 (12)	30 (88)
Time of delivery			
Premature****	81 (14)	41 (51)	40 (49)*****
Full term****	499 (86)	225 (45)	274 (55)*****
Breastfeeding initiation (n = 490)			
Within 1 hour****	441 (90)	236 (54)	205 (46)
Later****	49 (10)	30 (61)	19 (39)

EBF: exclusive breastfeeding

* EBF means no food or drink (not even water), except breast milk

** Non-EBF means infants not breastfeeding at all, or those predominantly breastfeeding

*** Complications with either vaginal or Caesarean deliveries

**** Association between the time of delivery and breastfeeding initiation (p-value 0.000, odds ratio 6.2)

***** Comparison between exclusive breastfeeding and non-exclusive breastfeeding (p-value 0.354)

Socio-demographic characteristics

The socio-demographic data are summarised in Table III. In total, 580 mothers were interviewed. The mean age of the infants was 2.9 ± 1.5 months. Only 14% of the infants were ≤ 1 month old, and less than 10% were aged ≥ 5 months.

Breastfeeding practices

Breastfeeding initiation

Most (n = 490, 85%) of the mothers were breastfeeding at the time that the study was conducted, and of these, 90% initiated breastfeeding during the first hour of delivery. The remaining 10% initiated breastfeeding a day after delivery. The number of children being exclusively and non-exclusively breastfed at the time of the study, according to the different socio-demographic characteristics, is demonstrated in Table III. Early breastfeeding initiation did not significantly affect the chances of being exclusively breastfed

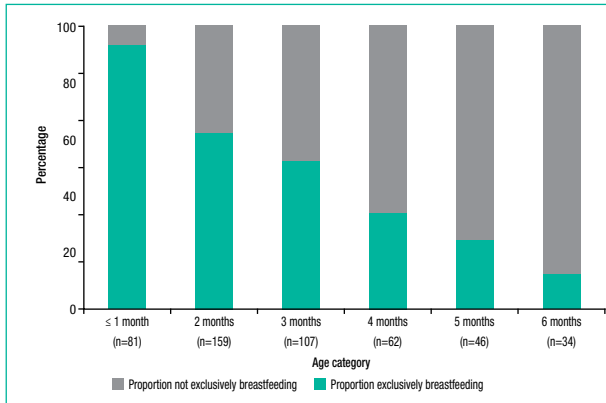


Figure 1: Exclusive breastfeeding rates according to age category (n = 266)
ARV: antiretroviral, HIV: human immunodeficiency virus

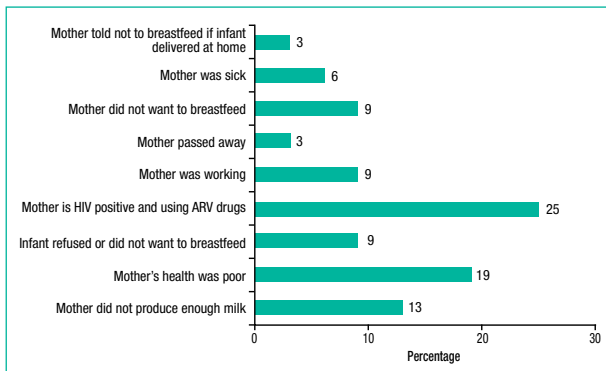


Figure 2: Reasons given by mothers for not breastfeeding their infants (n = 32)

(p-value 0.740). However, mothers who delivered full-term babies were most likely to initiate breastfeeding within the first hour of delivery. Being born full term or prematurely did not significantly affect the EBF rate at the time that the study was conducted (p-value 0.354).

Exclusive breastfeeding

The percentage of mothers practising EBF at the time of the study was 48% (n = 266 of 580). The mean age of infants being exclusively breastfed was 2 months (8.3 weeks). The decrease in the EBF rate over time is clearly shown in Figure 1.

Only four of the 34 mothers interviewed at 6 months (12%) had exclusively breastfed for six months at the time that the study was conducted. However, 6% (32 of 580) of the mothers did not breastfeed their infants at all. The mother's HIV status was the most common reason given for this. Other reasons provided by mothers for never breastfeeding are summarised in Figure 2.

Breastfeeding cessation

Of the mothers who had stopped breastfeeding, (n = 58) 40% ceased doing so within one month of the birth of their infant. Breastfeeding cessation practices according to the age of the infant (grouped according to category) are shown in Figure 3. The most important reason for cessation was that the mother had to return to work.

The different reasons given for breastfeeding cessation are also summarised in Figure 4.

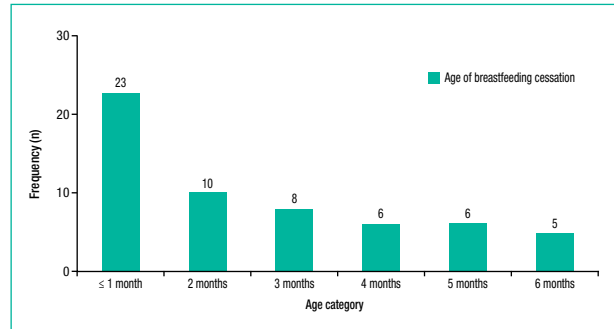
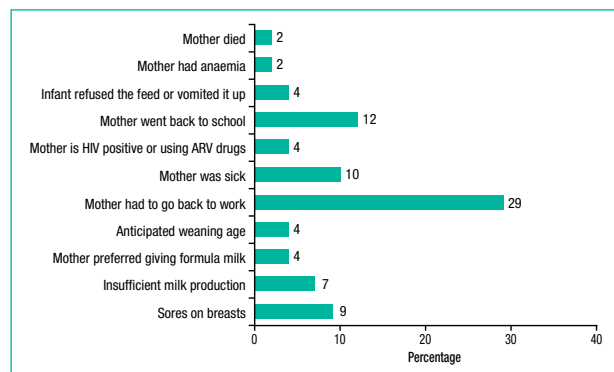


Figure 3: Breastfeeding cessation practices of mothers according to the age of the infant, grouped according to category (n = 58)



ARV: antiretroviral, HIV: human immunodeficiency virus

Figure 4: Reasons given by mothers for breastfeeding cessation at the time of the study (n = 58)

Table IV: Mothers' perceptions of the importance of breastfeeding

The importance of breastfeeding	n = 580
	n (%)
Breast milk contains adequate nutrients for the infant	239 (41)
Breast milk protects the infant from infections and illness	159 (27)
Breastfeeding is economical	50 (9)
Breastfeeding helps the mother and infant to bond	44 (8)
Do not know	33 (6)
Breast milk makes the infant grow strong and well	28 (5)
Breast milk is clean, warm, best, and natural food for the infant	12 (2)
Breast milk is always available and is convenient to give	15 (3)

Mothers' perceptions of the importance of breastfeeding

Interviewed mothers were asked why they thought that breastfeeding was important. More than a third (41%) said that breast milk contains adequate nutrients for the child. Only 6% of the mothers did not know. The different perceptions of the importance of breastfeeding, as reported by the mothers, are highlighted in Table IV.

The practices of mothers who did not perform exclusive breastfeeding

At the time of the study, 314 (54%) mothers were not exclusively breastfeeding, and gave other liquids or food to their infants. Nearly half (n = 154, 49%) of the mothers gave their infants infant-feeding

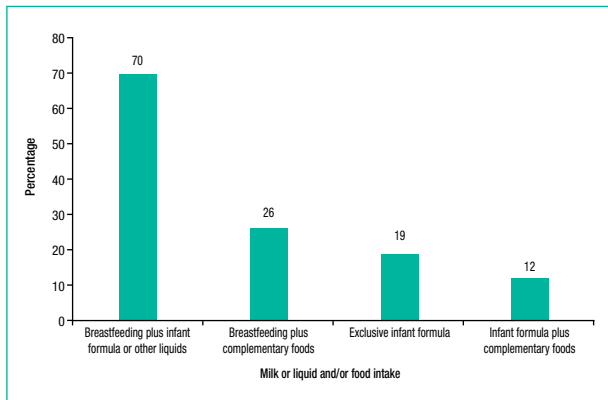


Figure 5: The feeding practices of mothers who did not exclusively breastfeed their infants at the time that the study was conducted (n = 314)

Table V: Reasons offered by the mothers for giving their infants other liquid and/or food

Reason	n = 314	
	n	(%)
Breast milk alone was insufficient	95	(30)
The mother had to return to work	23	(7)
The infant was thirsty all the time	19	(6)
There was insufficient milk production	14	(5)
The mother had to return to her studies	11	(4)
The mother was advised to do so by a family member	10	(3)
The mother was ill	9	(3)
The mother (incorrectly) believed that the consumption of water would keep the baby's navel free of infection	6	(2)
The mother was on antiretroviral drugs or was HIV positive	6	(2)
The mother was advised to do so by a health practitioner	5	(2)

HIV: human immunodeficiency virus

formula, whereas only 3 (1%) gave cow's milk, 99 (32%) water, 7 (2%) tea, and 3 (0.9%) other unspecified liquids.

The different feeding practices of the mothers who were not exclusively breastfeeding are shown in Figure 5. The majority (n = 220, 70%) of the mothers gave either infant-feeding formula or other liquids (water, tea or juice), in addition to breast milk, to their infants. Nearly a fifth (n = 59, 19%) of the mothers fed their infants formula exclusively.

Nearly a third (n = 95, 30%) of the mothers gave their infants milk, and other liquid and/or food because they believed that their breast milk alone was insufficient, while 23 (7%) mothers gave other foods because they had to return to work. The top 10 reasons for feeding their infants other food or liquids are given in Table V.

Dietary intake

Twenty-four hour recall was completed by both the EBF (n = 266) group and the non-EBF group (n = 314). This was performed as part of a validating procedure to ensure that mothers who reported exclusively breastfeeding their infants actually did so, and did not offer them water or other liquids too. Of the mothers who were not

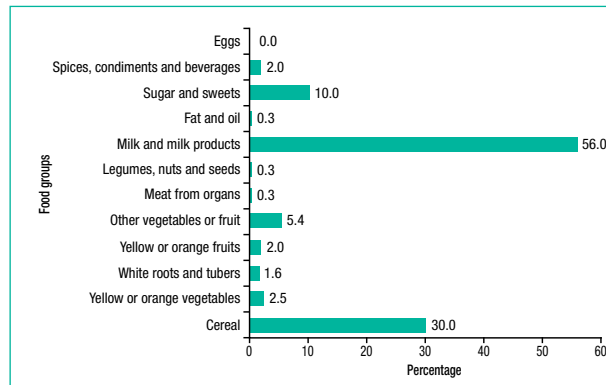


Figure 6: The dietary intake of infants who were not exclusively breastfed, according to the Food and Agriculture Organization of the United Nations dietary diversity list (n = 314)

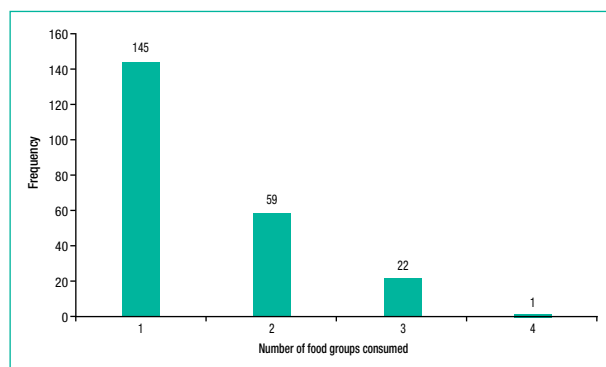


Figure 7: The dietary diversity of infants who were not exclusively breastfed, according to the Food and Agriculture Organization of the United Nations dietary diversity list (n = 314)

exclusively breastfeeding, the majority (n = 247, 93%) reported that the diet recall was typical of what the infant ate or drank on a daily basis. The dietary intake of infants categorised according to the different food groups in the FAO dietary diversity list (this list does not include breast milk) is shown in Figure 6. None of the mothers gave their infants food from the following food categories: dark green leaves, meat and poultry (fleshy meat), eggs, and fish and seafood. More than half (n = 175, 56%) of the mothers predominantly gave their infants fortified infant-feeding formula. Ten per cent (n = 31) gave them sugar and sweets. This group of foods included sugar added to tea, water or milk feeds.

Dietary diversity

The standard for minimum daily dietary diversity was achieved if infants consumed four or more food groups from the FAO dietary diversity list of 12 food groups. The dietary diversity of the infants who were not exclusively breastfed is demonstrated in Figure 7. Only one infant met the standards for minimum dietary diversity. The majority of the infants consumed food from only one group.

The introduction of milk, liquids and semi-solid or solid food

For the purposes of this study, the first drink that was given to the infant was defined as any fluid or liquid other than breast milk. The different stages of the introduction of infant-feeding formula, the first drink (other than breast milk) and complementary food, according to the different ages of the infants (grouped according to category) is

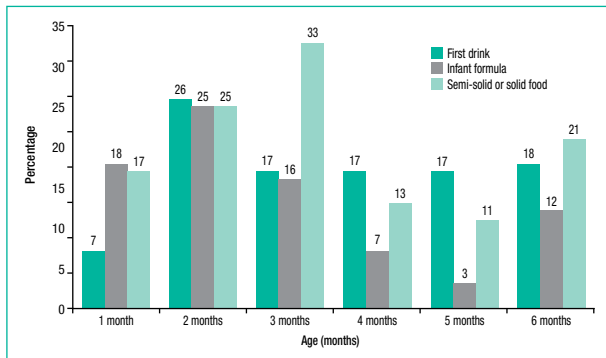


Figure 8: The introduction of infant formula, liquids and semi-solid or solid food to infants who were not exclusively breastfed

shown in Figure 8. The sample size comprised mothers who were not exclusively breastfeeding their infants ($n = 314$, 54%) at the time that the interviews were conducted. Significantly more mothers ($n = 122$, 39%) reported that infant-feeding formula was the first drink, besides breast milk, that was given to their infants (p -value < 0.000 , while 62 (20%) said that water was the first drink. Nearly half ($n = 150$, 48%) of the mothers added sugar to the milk feeds and to drinks. Furthermore, 176 (56%) of the mothers used a bottle to feed their infants, 27 (9%) practised cup feeding, and 21 (7%) spoon fed their infants. Nearly two thirds ($n = 195$, 62%) reported that their infants had consumed fluid or liquid from a bottle the night before the day on which the interviews were conducted.

More than a third ($n = 116$, 37%) of the mothers in the non-EBF group introduced complementary food (semi-solid or solid) to their infant when they were aged between one and six months, as shown in Figure 8. A third (33%) of the mothers introduced complementary food when the infant was three months of age. Nearly half ($n = 131$, 42%) reported giving food to their infant between one and six times a day. The mean was 2.5 ± 1.1 times a day. Twenty (7%) mothers reported that their infant ate semi-solid or solid food once a day, 53 (17%) said that this occurred twice a day, 46 (15%) three times a day, 7 (2%) four times a day, 4 (1%) five times a day, and 2 (1%) six times a day.

Discussion

Nearly half of the mothers were exclusively breastfeeding at the time of the study, and 12% continued to do so until their infant was six months. While this is considerably below the 2014 International Conference on Nutrition Rome Declaration on Nutrition and Post-2015 Development Agenda target rate of 50% EBF for the first six months of the infant's life, the results of this cross-sectional study are in agreement with other South African studies in which breastfeeding practices were evaluated.^{5,10,15,19,26} Our finding that the breastfeeding initiation rate within the first hour of delivery was very high suggests that the early initiation of breastfeeding following delivery, as recommended by the WHO, is being practised across these four provinces.

In addition, the findings showed that the stage of delivery (in this case, full-term delivery) was significantly associated with early

breastfeeding initiation. Most of the mothers who delivered full-term babies were most likely to initiate breastfeeding within the first hour of delivery. However, a statistically significant association between the type of delivery and the likelihood of exclusively breastfeeding was not demonstrated by the results. This is in contrast to a study in which it was shown that vaginal delivery was associated with a higher breastfeeding rate.¹⁸ The location of delivery also seemed to influence EBF practices as nearly 5% of the mothers reported that they were advised by healthcare professionals not to breastfeed if their infant was delivered at home.

The EBF rate of 12% for infants aged six months in the current study is relatively higher than that reported in studies conducted in other parts of the country.^{5,9,10,15,27,23} On the other hand, the findings in this study on the rate of EBF, although lower in comparison with studies conducted elsewhere in the country, showed that the EBF rate decreased from one month onwards, hence the very low EBF rate at six months. In this regard, EBF over a lengthy period still remains uncommon within South Africa, and strategies are needed to promote EBF initiation and maintenance.

Previous research shows that strategies which do not engage important family members, like grandmothers, in supporting breastfeeding are likely to fail.²⁷ Therefore, the MomConnect programme, recently launched by the South African Department of Health, could be an effective intervention in promoting EBF and providing support to pregnant mothers and mothers-to-be during pregnancy, after delivery and beyond. In order to achieve the global target of increasing the EBF rate up to at least 50% during the first six months (2014 International Conference on Nutrition Rome Declaration on Nutrition and Post-2015 Development Agenda), the WHO also recommends that mothers should avoid using bottles, teats or pacifiers, and should instead breastfeed on demand, i.e. as often as the infant wants, day and night. Such messages should be communicated to mothers through breastfeeding counselling, which has been shown to be an effective intervention in improving EBF rates. It was also reported in one study²¹ that higher rates of EBF may have been influenced by the fact that mothers report that they are exclusively breastfeeding, even when giving water to their infant. Solutions to this problem may include further education and breastfeeding awareness. Twenty-four hour recall was used in this study to validate whether or not mothers were exclusively breastfeeding, and not giving water, or other liquid or foods to their infant.

The calculation of the EBF rate for six months is a variable which could possibly contribute to the disparity in EBF rates reported in the studies. To assess the EBF rate, an indicator defined as the percentage of children aged ≤ 6 months who are being exclusively breastfed at a point in time is used. However, this indicator actually describes the prevalence of EBF, that is, whether children aged ≤ 6 months are currently being exclusively breastfed at the time that the survey is conducted.⁸ The EBF recommendation is that every child should be exclusively breastfed until they reach the six-month anniversary of their birth, that is, for the full duration of six months.

Therefore, according to the method used in this study, the actual duration of EBF was assessed, as it is calculated by including only infants in their sixth month of life. The formula used in this study is now illustrated (other studies in which similarly low EBF rates were reported^{5,9,20,21} used this same method of calculation):

Six-month EBF rate = infants (in their sixth month of life) who received only breast milk the previous day

Total number of infants (six months old)

However, this method of calculation differs from the methods used in two other studies^{10,15,23} in which higher EBF rates at six months of age were reported using the following method of calculation, and included the entire sample of infants aged ≤ 6 months old:

EBF rate = infants (0-6 months of age) who received only breast milk the previous day

Total number of infants included in the study

Thus, the extent to which EBF is practised up to six months using appropriate and accurate indicators in order to promote EBF for the recommended six months.

Although the total number of mothers who chose not to breastfeed at all was very low in this study, the most cited reasons for this were the mothers' HIV status and poor maternal health. These results suggest that the resolutions contained within the Tshwane declaration may not have been effectively implemented. Despite the generally high level of HIV awareness, mothers still demonstrated an unclear understanding that they could breastfeed their infant, regardless of their HIV status.^{20,26,28,29} In addition, some mothers reported that they did not produce enough milk. This phenomenon is described as "insufficient milk syndrome", and it has been proposed that alternative explanations exist for this issue in cases when it is a "real" phenomenon.³⁰ It may not be an excuse used by mothers to validate reasons for early breastfeeding cessation or early initiation of complementary food, but owing to lack of or insufficient contact between the mother and infant. A qualitative analysis of interviews indicated that the maternal experience of hunger contributes to perceived milk insufficiency, as do anxiety about infant hunger and a perception that access to adequate food is necessary for successful breastfeeding to occur.³¹ It was also reported in one study that in comparison with white and African American mothers, Hispanic mothers were most likely to use the perception of milk insufficiency as a reason for early breastfeeding cessation.³²

Maternal depression and distress have been shown to be a significant predictor of reduced duration and exclusivity of breastfeeding in developed countries.³² Psychological stress, possibly associated with severe food insecurity and malnutrition, could impair milk let down, subsequent milk output and breast emptying in the developing country context. Physiological mechanisms which could potentially alter the concentration of certain fats and micronutrients, as well as breast milk output, include hunger, which can drive perceptions of the body's inability to produce sufficient milk.³²

This may be a cause for concern, and is an issue which should be addressed by more in-depth education and breastfeeding awareness programmes. It was shown in the study by Hurley et al³² and other recent systematic reviews that breastfeeding education and community-based interventions significantly improved EBF rates in developing countries.^{27,33,34} In addition, it was reported that mothers with a higher level of education or income were more likely to initiate breastfeeding, and to breastfeed for longer, than mothers with a lower level of education.²⁹

Breastfeeding cessation was reported as early as one month of age in this study. The most often-stated reason was that the mother had to return to work. This could mean that mothers were either given insufficient maternity leave, or that self-employed mothers had no maternity leave at all. The findings of this study are similar to those which have been reported in several studies in which it was demonstrated that insufficient leave can influence a mother's choice of feeding practice.^{12,26,35,36} On the other hand, even if a mother has to return to work early, it is still possible to express breast milk and to leave it at home for the caregiver to administer, either with a cup or a spoon. The results of this study also showed that some mothers stopped breastfeeding because they had to go back to study. Programmes in which multi-component educational strategies for contraception and the prevention of teenage pregnancies were employed have been successful in the developing world.³⁷ In this regard, going back to study would not be a reason for early breastfeeding cessation.

Evidently, the early introduction of food, mixed feeding and failure to breastfeed exclusively, remain major challenges in South Africa. Healthcare workers and mothers both need to be educated on the importance of exclusive breastfeeding and timing with regard to the appropriate initiation of complementary food. The findings of this study appear to be consistent with those in other studies in which the peak initiation of complementary food was demonstrated to occur as early as within the first month,²¹ at one month,^{5,15} and at two months.¹⁴ The most often-stated reason for the early initiation of complementary food was that the mothers' breast milk was "not enough" for the infant. Esterik³⁸ proposes that human milk production is controlled by the infant's appetite, the frequency of milk removal and the mother's ability to produce milk. Therefore, it is suggested that a distinction should be made between the phenomenon when it occurs during EBF, and when it occurs once complementary feeding has begun. It could be referred to as a cultural phenomenon when it occurs during EBF, and as a largely physiological response to reduced nipple stimulation once complementary feeding has begun.

The dietary data indicated that infant-feeding formula was the fluid most commonly consumed. What was concerning in this study is that 10% of the mothers added sugar to some of the milk feeds and drinks which they introduced to the infants. The early introduction and consumption of sugar by infants may create a pattern of preference for sweet and fatty food, which can continue in later years.³⁹ A third of the infants in this study were given maize meal porridge as the introductory complementary food. Homemade cereal or porridge

was the second most frequently consumed food by infants in the SANHANES-1 study, and maize meal porridge remains among the top 10 consumed foods in South Africa. Maize meal porridge is not only bulky and of low nutrient density, but is also high in phytate, which inhibits zinc and iron absorption.¹⁷ It has been demonstrated in other studies that using cereal-based gruel is a common complementary feeding practice.^{6,10,40} Only one infant met the minimum dietary diversity standards in our study. Infants are at risk of becoming stunted if they do not receive sufficient dietary diversity with the introduction of complementary food.²⁷ It has also been demonstrated that infants who are introduced to complementary feeding too early can self-regulate their energy intake by decreasing their breast milk consumption, and this can lead to abrupt breastfeeding cessation.²⁰

Feeding practices influence infection and mortality.⁴¹ A causal association between early breastfeeding and reduced infection-specific neonatal mortality in young infants was demonstrated in one study.⁴² It was proposed in another study⁴³ that infants who had been breastfed for 4-6 months were at a lower risk of contracting respiratory or gastrointestinal tract infections in the first six months, compared to those who had never been breastfed. Breastfeeding for at least six months seems to have protective effects against respiratory and gastrointestinal tract infections during that period. This protective effect improves with a longer duration and with EBF.⁴⁴ These findings support health policy strategies which seek to promote EBF for the recommended period of six months. Therefore, promoting these programmes helps mothers to choose an appropriate infant-feeding practice and to commit to it, thereby potentially reducing the risk of infection in their infant.

Despite challenges to breastfeeding exclusively, the mothers in this study demonstrated a sound understanding of the importance of breastfeeding. They may have known and understood that breastfeeding is important, but may not have received the proper support and encouragement needed to breastfeed their infants. Schmieid et al⁴⁵ showed that peer support, and professional support and guidance were identified as very important elements of breastfeeding success. Although this was not investigated, in other studies^{1,40} an association between mothers' perceptions of breastfeeding and their choice of feeding practice were found.

Limitations of this study include the fact that there was a low number of six-month-old infants in this study. This is possibly because some of the mothers did not expect to be at the health facilities at the time of the study, especially if the specific infant day visit at the health facility was for six-week-old infants. Therefore, the age distribution may have been influenced by the age at which children were expected to visit the clinics. Thus, there might have been some bias in the study. In addition, although the main reason given for not breastfeeding at all was poor maternal health, the total number of mothers in that category was very low. Adequate insight into the context in which infants were fed infant formula in this study was not obtained. Thus, even though it is accepted that infant formula feeding or bottle feeding are not ideal methods of feeding infants aged ≤ 6 months, they might have been the only choice available to many mothers who opted for this method of feeding their infants.

Conclusion and recommendations

A high breastfeeding initiation ratio, but a very low six-month EBF rate of 12%, was demonstrated in this current study; far below the 2014 International Conference on Nutrition Rome Declaration on Nutrition and the Post-2015 Development Agenda target of 50%. It was also shown in this study that some mothers may not have had a clear perception and understanding of the importance of breastfeeding. The early initiation of complementary food remains a problem in South Africa. There is not much diversity with respect to the food being given to infants from the different food groups, and the food that is consumed by infants is nutritionally inadequate, presenting additional risks to their well-being.

The most frequently stated reasons given by the mothers for not breastfeeding at all were having to return to work or their studies early, the mother's HIV status and poor maternal health. Therefore, healthcare professionals should conduct educational sessions in which mothers can participate, including sessions on how to maintain breastfeeding after returning to work or pursuing studies. Emphasis must also be placed on ARV drugs, and balancing the risks of not breastfeeding against the risks of HIV transmission.

Community-based strategies to educate teenagers, women and mothers on appropriate complementary foods for infants should be implemented. It is also important to ensure that practices and behaviour in healthcare settings always protect, promote and support breastfeeding. Possible strategies to increase exclusively breastfeeding for longer periods include family and community support groups, an increase in paid maternity leave days, further education and breastfeeding awareness. To reach the 2014 International Conference on Nutrition Rome Declaration on Nutrition and the Post-2015 Development Agenda goal of a rate of 50%, the entire nutrition fraternity, including government, academia, industry and development agencies, needs to intervene and develop more innovative approaches, such as workplace support and interventions, as well as the use of mass media, to disseminate appropriate infant-feeding messages in order to increase the rate of EBF in South Africa.

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Conflicts of interest

The authors declare that they have no conflict of interest.

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