

## KNOWLEDGE, ATTITUDES AND PRACTICES OF MOTHERS REGARDING BREASTFEEDING AND COMPLEMENTARY FEEDING

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### ABSTRACT

The appropriate and adequate feeding practices by mothers are important determinants in ensuring optimal health and well-being during infancy and early childhood. However, some mothers who visit public health clinics have minimal knowledge of breast- and complementary feeding.

This study aimed to determine the knowledge, attitudes and practices of mothers regarding breastfeeding and weaning.

A purposefully selected sample of 200 mothers with children below two years of age in the Colesberg district, Northern Cape, participated. After consent, a questionnaire on infant and early childhood feeding was completed with the assistance of a fieldworker. Anthropometrical measurements were conducted on the children, followed by a 24-hour dietary recall. The nutritional status of the children was analysed utilising the WHO Anthro Survey Analyser Tool. Microsoft Excel and IBM Social Sciences Statistics Data Editor Version 24 were used for analysis. Together with literature on infant and early childhood feeding from the WHO (2021) and the Road to Health Booklet (2018), this data was utilised to compile an intervention key ring.

The findings indicated that mothers have good knowledge regarding infant feeding; however, their incorrect feeding practices do not reflect this. Significant associations between mothers' practices and the nutritional status of their children were found. Qualitative research, such as focus groups, is necessary to investigate the possible challenges and

explain why mothers are not practising their knowledge obtained regarding infant feeding.

### KEYWORDS

early childhood, breastfeeding, weaning

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### ARTICLE INFO

Submitted June 2024

Revision July 2024

Accepted July 2024

doi: <https://dx.doi.org/10.4314/jfecsc.v7i1.271661>

### INTRODUCTION

Establishing and implementing a healthy, nutritious diet plays an indispensable role in

an infant's overall health, well-being, growth and development (World Health Organization (WHO), 2021). Mothers' incorrect or inadequate feeding of infants is attributed to life-threatening conditions, such as severe acute malnutrition (SAM), moderate acute malnutrition (MAM), stunting, overweight and obesity (WHO, 2021).

Parents are responsible for ensuring their children's adequate nutritional intake. Globally, in 2020 alone, 149 million children under the age of five were estimated to be stunted, 45 million were estimated to be wasted, and 38.9 million were overweight or obese (WHO, 2021). According to the Global Nutrition Report (2021), 21.4% of children in South Africa are stunted, 3.4% of children under the age of five years are wasted and the prevalence of overweight children under the age of five is 11.6%. Data obtained from Visagie (2022), the district dietitian in the Pixley Ka Seme District Municipality (Colesberg), Northern Cape, indicated that 45% of young children seen at the hospital and clinics, presented with MAM, 33% presented with SAM and 0.29% presented with overweight or obesity in 2022.

Exclusive breastfeeding and complementary feeding (weaning) are essential to ensuring satisfactory growth and development during infancy and early childhood. The WHO recommends that an infant be exclusively breastfed on demand or every three hours in 24 hours from birth to six months for optimal growth, health and development (WHO, 2021). Thereafter, mothers or caregivers must ensure the provision of nutrient-rich, safe, and adequate complementary foods to meet the evolving needs of their infants (Chakona, 2020).

Theurich, Grote and Koletzko (2020) define the period of complementary feeding or weaning as the transition from an exclusively milk-based diet to an increasingly diverse diet, incorporating both plant- and animal-based

foods. The period of complementary feeding is from six to 24 months of age.

The South African Paediatric Food-Based Dietary Guidelines (SAPFBDG) (Vorster, Badham & Venter, 2013) and the Road to Health Booklet (2018) stipulate that from six months, breastfeeding should continue on demand, in addition to complementary feeding of one to two teaspoons, twice a day. A mother or caregiver should gradually increase the amount and adequacy of feeds. From six months of age, iron-rich foods, starches, vegetables and soft fruits without pips should be provided, as these are essential for maintaining a healthy weight (Vorster *et al.*, 2013). These food items should be mashed and/or cooked until soft to enable infants to swallow easily (Road to Health Booklet, 2018).

From nine months of age, babies' complementary feeding should change to five small meals of a quarter cup each per day. By 12 months, complementary feeding should increase to five meals of half a cup daily. Infants and young children still require iron-rich foods and small pieces of food they can hold. From 12 months up to five years, providing children with five small meals a day of one full cup is essential. A variety of iron-rich foods, starches, vegetables and fruits is beneficial. Foods high in vitamin A should be provided during this age (Road to Health Booklet, 2018). The WHO (2021) recommends that breastfeeding continues for up to two years or beyond.

The aim of this study was to determine the knowledge, attitudes and practices of mothers, visiting the Lowryville and Kuyasa clinics in the Colesberg area, regarding breastfeeding and complementary feeding. Together with literature on infant and early childhood feeding from the WHO (2021) and the Road to Health Booklet (2018), a intervention key ring was developed to assist in improving mothers' knowledge and to

encourage the correct attitudes and practices regarding infant and early childhood feeding.

## METHODS

A cross-sectional, quantitative study design was used for a purposeful selected sample of 200 mothers with children below two years of age, visiting the Lowryville and Kuyasa clinics in the Colesberg area, Northern Cape. Mothers between the ages of 18 and 45 visiting the clinics for routine check-ups and vaccinations, were included, if they gave consent for the study, while mothers whose children were ill, were not included in the study.

The mothers completed a questionnaire on infant and early childhood feeding practices with the assistance of a fieldworker. The questionnaire was developed in consultation with the other dietitians in the specific district and focused on the issues that were experienced by the mothers and that were discussed during consultations. A pilot study was done, using 50 mothers as sample, with the questionnaire to test the questions and ensure that the mothers understand the questions. Changes were made where necessary before the main study was undertaken. The researcher then conducted anthropometrical measurements on their children (0–24 months) and recorded 24-hour dietary recall. The questionnaire included information on the demographical data of the mother and the nutritional status of the child. Anthropometrical measurements (weight and height/length) were charted on the growth chart of the children (Road to Health Booklet charts) and mid-upper arm circumference (MUAC) were taken. Thereafter, the researcher requested information on infant and early childhood feeding practices, and knowledge and attitudes about infant and early childhood feeding. The three-pass method for the 24-hour dietary recalls was

used (Nightingale, Walsh, Olupot-Olupot, Engoru, Ssenyondo, Nteziyaremye, Amurut, Nakuya, Arimi, Frost & Maitland, 2016).

The data from the questionnaires were coded and captured onto a Microsoft Excel spreadsheet and a statistician assisted in analysing it using the IBM Statistical Package for Social Sciences (SPSS) Statistics Data Editor Version 24. The nutritional status of the children was analysed using the WHO Anthro Survey Analyser Tool. Both descriptive and inferential statistical analyses were conducted.

Ethical clearance for the study was obtained from Nelson Mandela University and the Northern Cape Department of Health. The three main ethical principles, namely, respect for persons, beneficence and justice (Krishnamurthy, 2011), were upheld during the study. The anonymity and confidentiality of the participants were ensured in reporting the research findings, by not including any names on the questionnaires, only numbers.

A pilot study was conducted with 50 mothers with children under two years of age who visited the Kuyasa and Lowryville clinics. The validity of the questionnaire and observational checklist was tested by determining whether the data collection methods and findings were in line with the study's aims and objectives.

The key ring that was compiled as an intervention to assist in improving mothers' knowledge and to encourage the correct attitudes and practices regarding infant and early childhood feeding, was available in English, Afrikaans and isiXhosa. It provided practical advice on how mothers can ensure infant and early childhood feeding practices of high nutritional quality and adequacy.

**TABLE 1: BIOGRAPHICAL DATA OF MOTHERS**

Variable	Categories	Frequency n (%)
Clinic attended	Lowryville Clinic	54 (27.00)
	Kuyasa Clinic	146 (73.00)
Age of mothers (years)	18 – 20	34 (17.00)
	21 – 30	103 (51.50)
	31 – 40	58 (29.00)
	41 – 45	5 (2.50)
Employment status	Employed	34 (17.00)
	Unemployed	166 (83.00)
Marital status	Married	28 (14.00)
	Not married	172 (86.00)
Number of children	1	74 (37.00)
	2	55 (27.50)
	3	40 (20.00)
	4	21 (10.50)
	> 5	10 (5.00)
Educational status	High school complete	107 (53.50)
	High school not complete	93 (46.50)
Age of the children	<1 month	5 (2.50)
	1 – 6 months	101 (50.50)
	7 – 12 months	61 (30.50)
	13 – 18 months	28 (14.00)
Birth weight of children	Micronate to very low birth weight: <750 g – 1 499 g	0 (0.00)
	Low birth weight: 1 500 – 2 499 g	47 (23.50)
	Normal birth weight: ≥ 2 500 g	153 (76.50)

**TABLE 2: THE KNOWLEDGE OF THE MOTHERS**

Question	Frequency agreed n (%)	Frequency disagreed n (%)
Important to breastfeed	187 (93.50)	13 (6.50)
Breastmilk has all the nutrients	192 (96.00)	8 (4.00)
Breastmilk provides enough water	191 (95.50)	9 (4.50)
Important to receive food before six months	142 (71.00)	58 (29.00)
Complementary feeding should be introduced from four months	145 (72.50)	55 (27.50)
Iron rich foods are good from six months	147 (73.50)	53 (26.50)
Starches are not good from six months	115 (57.50)	85 (42.50)
Soft fruits are good from six months	173 (86.50)	27 (13.50)
Important to provide a variety of foods from six months	185 (92.50)	15 (7.50)
Safe to give water from six months	176 (88.00)	24 (12.00)
Vitamin C foods are good from twelve months	189 (94.50)	11 (5.50)

## RESULTS

### Biographical information

The majority of mothers (51.50%, 103) were aged 21–30 years, and 83% (166) were unemployed. Most mothers (86%, 172) were not married, and 37% had only one child. Fifty-three point five per cent (107) completed high school (see Table 1).

### Knowledge of the mothers

It was evident that mothers generally have a good knowledge base regarding infant feeding. The average score for ten of the eleven questions that tested knowledge, was above 70% correct. Mothers lacked knowledge that starches, such as fortified maize meal porridge, mashed sweet potato or mashed potato, are good options to feed their

child from six months of age. Interestingly, only 51.1% (103) of the mothers introduced starches, such as pap and cereal, into their child's diet at six months (see Table 2).

### **The attitudes and practices of the mothers**

As evidenced in Table 3, 86% (172) of mothers did not think that giving their child tea to drink before six months of age is important, which is correct. However, upon assessing the nutritional status of children, when a child presented with SAM or MAM, mothers indicated that they provided these children with tea and/or coffee as a 'substitute' to breastmilk, or even formula. Shockingly, 34.5% (69) of mothers thought giving their child chips, sweets and fizzy drinks is important as a reward for good behaviour (see Table 3). Furthermore, 97.5% (195) of mothers reported that using the Road to Health Booklet to see how to feed their baby is essential. There was a significant association between mothers' occupational status and their attitude to give their children chips, sweets and fizzy drinks when they behave well ( $p=0.023$ ), those who are unemployed, give their children these snacks more often. In this study, 96.6% (193) of the mothers responded 'yes' to initiating breastfeeding at birth, and 70% (140) of those mothers were still breastfeeding at the time of data collection. Of the 53 mothers who stopped breastfeeding, 39 (73.58%) stopped breastfeeding when their child was aged two to six months. Of the 37% (74) of mothers who initiated formula feeding, only 3% (6) of the mothers were formula feeding correctly.

There was an inverse association between mothers' occupational status and their knowledge to exclusively breastfeed for six months ( $p=0.004$ ), with those who were unemployed having better knowledge concerning exclusively breastfeeding. The knowledge that mothers had to introduce complementary feeding from six months and

their correct practice of breastfeeding for six months exclusively, also correlated significantly ( $p<0.001$ ). This may be because employed mothers have less time to spend with their children, and they are not at home to breastfeed their children, therefore, they also have less knowledge. Furthermore, significantly more mothers who did not complete high school were still breastfeeding at the time of the study ( $p=0.028$ ), and considerably more mothers who finished high school, introduced formula feeding ( $p=0.012$ ) and formula fed at the time of data collection ( $p=0.005$ ).

There was a statistical significance between the number of children mothers had and their practice of still breastfeeding at the time of this study ( $p=0.042$ ), with those who had more children, breastfeeding for a longer period. This may be due to increased maternal age, experience, knowledge and the correct attitudes gained when caring for more children.

Mothers are not introducing a variety of foods into their child's diet. It is concerning that, contrary to this fact, 98% (196) of mothers believe that their child is receiving an adequate diet with a variety of nutrients. This believe is also not in line with the mothers' knowledge, as 92.5% (185) of the mothers knew that it is important to introduce a variety of foods into their child's diet.

There was a significant association between the number of children that mothers had and the knowledge of introducing iron-rich foods from six months ( $p=0.038$ ); mothers with more children had greater knowledge to introduce iron-rich foods. It may be that the more children they had, the more exposure they had to health talks at clinics and the more awareness they had about introducing iron-rich foods from six months.

In Table 3, it can also be seen that the limited

**TABLE 3: ATTITUDES AND PRACTICES OF THE MOTHERS**

Question	Frequency Agreed n (%)	Frequency disagreed n (%)
<b>Attitudes</b>		
I think it is important to give my child tea to drink before six months	28 (14.00)	172 (86.00)
I think it is important to give my child chips, sweets and fizzy drinks when they behave	69 (34.50)	131 (65.50)
I think it is important to use the Road to Health Booklet to see how to feed my baby	195 (97.50)	5 (2.50)
I think my child is receiving an adequate diet with a variety of nutrients	196 (98.00)	4 (2.00)
I think my child is growing well	187 (98.50)	3 (1.50)
Mothers who initiated breastfeeding at birth	193 (96.00)	7 (4.00)
Mothers who are still breastfeeding at the time of data collection	140 (70.00)	60 (30.00)
Mothers who formula feed babies	74 (37.00)	-
Mothers who know how to formula feed correctly	6 (3.00)	-
Mothers exclusively breastfeed/formula fed or were planning to for the first 6 months of their child's life	131 (65.50)	-
Mothers who introduced complementary feeding at the correct age	103 (51.50)	-
Time period of mothers stopping breastfeeding	>1 month	5 (9.43)
	2 – 6 months	39 (73.58)
	7– 24 months	9 (16.98)
Age of baby when formula feeding was initiated	<1 month	14 (18.92)
	1 – 6 months	51 (68.92)
	7 – 9 months	9 (12.16)
	>9 months	0 (0.00)
List of foods or drinks added to children's diets	Water	112 (56.00)
	Fruit juice	74 (37.00)
	Tea/coffee	50 (25.00)
	Vegetables	108 (54.00)
	Fruit	96 (48.00)
	Pap/cereal	103 (51.50)
	Beef/pork/chicken/lamb	76 (38.00)
	Lentils/beans	64 (32.00)
	Rice	86 (43.00)
	Sweets/chips	82 (41.00)
Milk/milk products	90 (45.00)	

addition of fruit (48%, 96), vegetables (54%, 108) and milk (45%, 90) may be a cause for concern; for instance, considering iron – only a few mothers (38%, 76) reported to add meat to the weaning diet. Limited financial resources may be a reason.

As a result, it can be concluded that, in general, mothers know how to feed their children correctly; however, they do not practice evidenced-based feeding guidelines regarding the importance of adding a variety of foods to their child's diet.

### Nutritional status

As evidenced in Table 4, most children plotted a normal weight-for-age, length-for-age, weight-for-length and MUAC. This is an indication that they grow well. However, this study was only conducted with mothers who attended the clinics for routine visits and whose children were not ill. Mothers who attended the hospital or had sick children, were not included in the study, and therefore it does not correlate with the information obtained from Visagie (2022), who indicated that of all children, 45% seen in the district

**TABLE 4: NUTRITIONAL STATUS OF THE CHILDREN**

Variable	Categories	Frequency n (%)
Weight for age	-3 SD (Severely underweight)	9 (4.50)
	-2 SD (Underweight)	15 (7.50)
	-1, 0, +1 SD (Normal)	169 (84.50)
	+2 SD (Overweight)	4 (2.00)
	+3 SD (Obese)	3 (1.50)
Length for age	-3 SD (Severely stunted)	27 (13.50)
	-2 SD (Stunted)	30 (15.00)
	-1, 0, +1, 2 SD (Normal)	139 (69.50)
	+3 SD (Very tall)	4 (2.00)
Weight for length	-3 SD (Severe Acute Malnutrition)	4 (2.00)
	-2 SD (Moderate Acute Malnutrition)	3 (1.50)
	-1, 0,+1 SD (No Acute Malnutrition)	156 (78.00)
	+2 SD (Overweight)	26 (13.00)
	+3SD (Obese)	11 (5.50)
Mid-Upper Arm Circumference	-3 SD(Severe Acute Malnutrition)	1 (1.28)
	-2 SD (Moderate Acute Malnutrition)	2 (2.56)
	0 SD (No Acute Malnutrition)	75 (96.15)

SD = standard deviation

**TABLE 5: ASSOCIATIONS BETWEEN NUTRITIONAL STATUS OF CHILDREN AND THE KNOWLEDGE, ATTITUDES AND PRACTICES OF THEIR MOTHERS**

Chi-square test	p value
The current weight of a child (normal) and the practice of complementary feeding from 6 months of age	0.002*
A child's weight for age (normal) and the practice of mothers currently giving complementary feeding	0.014*
The current weight of a child and the age that complementary feeding was initiated	0.035*
A child's weight for age (normal) and the number of times they are breastfed per day	0.002*
A child's weight and a mother's knowledge that starchy foods such as fortified maize meal porridge, mashed sweet potato and mashed potato are good from six months	0.537
A child's weight and a mother's knowledge about the introduction of a variety of foods from six months	0.041
The weight for length of a child (normal) and the mother's attitude to incorporate a variety of foods in their child's diet	0.006*
A child's length for age (normal) and the number of times that they were breastfed per day	<0.001*
A child's length for age and the number of months that they were breastfed	<0.001*
A child's length for age and a mother's knowledge to not give water to their child until six months	0.911
A child's length for age and a mother's knowledge to feed iron rich foods, such as dried beans, egg, minced meat, boneless fish, chicken or chicken livers from six months	0.350
A child's MUAC and a mother's knowledge to feed iron rich foods, such as dried beans, egg, minced meat, boneless fish, chicken or chicken livers from six months	0.376
The MUAC of a child (normal) and the number of months that they were breastfed	0.016*
The MUAC of a child and the length of time that mothers exclusively breastfed	<0.001*
The MUAC and the act of mothers starting complementary feeding at the correct age	0.033*
The current weight of a child (normal) and a mother's knowledge that it is safe to give their baby water from six months	0.026*
The current weight of a child (normal) and the mother's knowledge to incorporate a variety of food from six months	0.041*
The current length of a child (normal) and the mother's knowledge that vitamin C foods, are good for their child	0.039*
The weight for length of a child (normal) and the mother's knowledge to exclusively breastfeed for six months	0.009*

\* significant associations

hospital and clinics presented with MAM, 33% presented with SAM and 0.29% presented with overweight or obesity in 2022. The results of this study indicate that the nutritional status of children has improved since 2022.

### **Nutritional status of the children and their mothers' knowledge, attitudes and practices**

A chi-square test was used to investigate the association between the nutritional status of the child and the mother's knowledge, attitudes and practices. There was a significant association between the nutritional status of the children and the knowledge, attitudes and practices of the mothers (see Table 5). This has far-reaching complications for the dietetics and nutrition professions, as it shows that it is important to ensure that mothers get the correct education to increase their knowledge and motivation to have the correct attitudes and practices, and that is why there often is a lack of correlation between knowledge and practices, should be investigated.

There was a positive association between a child's current weight and the practice of complementary feeding from six months of age ( $p=0.002$ ). Positive associations were also found between a child's weight-for-age and the age when a mother introduced complementary feeding ( $p = 0.035$ ), and between a child's weight-for-age and the number of times a mother breastfed per day ( $p = 0.002$ ), with a normal weight-for-age resulting from mothers feeding correctly on demand in accordance with the infant's age. It was found that mothers who exclusively breastfed their child for six months and incorporated a variety of food items from six months of age, also had children with a normal weight-for-length ( $p = 0.06$ ).

As seen in Table 5, a significant association ( $p = 0.016$ ) was found between the MUAC of a child and the number of months they were

breastfed, with a normal MUAC resulting from breastfeeding for a longer period. A further association was found between the MUAC of a child and the length of time that mothers exclusively breastfed ( $p < 0.001$ ), with a normal MUAC resulting from exclusively breastfeeding for six months. Also, there was an association between the MUAC of a child and a mother starting complementary feeding at the right age, with a normal MUAC resulting from mothers starting to complementary feed at six months of age ( $p = 0.033$ ). Therefore, it can be concluded that mothers who follow the guidelines of exclusive breastfeeding for six months, continue breastfeeding for longer and start complementary feeding from six months, give their child a better chance to have a normal weight and height.

### **DISCUSSION**

The study aimed to determine the knowledge, attitudes and practices of mothers regarding the diets of their children (0–24 months) in Colesberg, Northern Cape. Findings of this study indicated that mothers have an overall good knowledge base regarding infant feeding; however, their practices do not reflect their knowledge, as:

- Mothers do not have the correct knowledge about starch or carbohydrates in the diet of the child who starts weaning.
- It is concerning that more than 70% of the mothers stopped breastfeeding when the child was between two and six months of age. It is an indication of a need for further education in this regard because the literature clearly recommends mothers breastfeed for at least two years and beyond (Lisboa, Miranda, Souza & Moura, 2021; UNICEF, 2021).
- Unemployed mothers and mothers who did not complete high school, implement better practices than working mothers, although they do not necessarily possess better knowledge. This could suggest that



mothers who fell pregnant or dropped out of school, have more time to take care of their children and have less money to buy, for example, formula feeds (Nuralita, Mutri & Pamungkasari, 2017).

- The unemployed mothers tend to give more unhealthy snacks, which may indicate a lack of knowledge on healthy snacking, that needs to be addressed. The unemployed mothers frequently have lower educational levels and, therefore, may have a lower knowledge base, and as they may be with their children all day, they may give such rewards for being good (Damen, Luning, Fogliano & Steenbekkers., 2019). However, it also contributes to the general belief that unhealthy snacks are cheaper than healthy snacks and more available (Reardon, Tschirley, Saweda, Liverpool-Tasie, Awokuse, Fanzo, Minten, Vos, Dolislager, Sauer, Dhar, Vargas, Lartey, Raza & Popkin, 2021).
- There is a positive correlation between healthy weight and height and good weaning practices. Introducing food other than breastmilk to children before six months of age may result in diarrhoea, constipation, infections and allergies and, consequently, SAM, MAM, stunting or even overweight and obesity (Road to Health Booklet, 2018; Masuke, Msuya, Mahande, Diarz, Stray-Pedersen, Jahanpour & Mgongo, 2021). Mothers in this study who fed their children according to evidence-based guidelines, had children with good nutritional status. According to Raiten and Bemer (2020) and the WHO (2021), stunting is a direct result of undernutrition. As found in this study, children, who were fed according to the infant feeding guidelines on breastfeeding, were a normal length-for-age.
- It is clear that the practice of pumping breastmilk and storing it for feeds, when the mother is not with the child, needs more attention so that mothers who are employed, can also continue with

breastfeeding.

The study indicated that the incorrect feeding practices of mothers have resulted in their children presenting with an unhealthy (lower or higher) weight, that can lead to SAM, MAM, overweight or obesity, as was also found by other studies (Masuke *et al.*, 2021). In addition, it contributed to stunting. Furthermore, mothers' correct infant and early childhood feeding practices have resulted in children presenting with a healthy nutritional status. It can be concluded that mothers know how to feed their children correctly, however, it is concerning that they are not practising evidenced-based feeding guidelines, specifically the addition of a variety of foods into their child's diet.

## CONCLUSION

The study revealed that mothers attending health clinics in the Northern Cape have a good knowledge base on the recommended infant and early childhood feeding practices, but need an in-depth understanding. Interventions is therefore crucial, in order to educate the mothers. With the use of a key ring intervention that served the purpose of educating the mothers on the correct knowledge and practices with regards to feeding their child, the study aspired to improve the in-depth knowledge, attitudes and practices of mothers, in an attempt to in turn improve the nutritional status of children. Thus, contributing to a reduction in the prevalence of children presenting with SAM, MAM, stunting, overweight and obesity.

Interventions in the form of a large-scale national study to investigate the reasons for not practising what mothers know and supporting mothers in following the correct practices based on their knowledge should be explored further in future research as from this and other studies. Qualitative focus group-

styled sessions need to be conducted with mothers to investigate the possible challenges and why they are not practising the knowledge obtained regarding infant feeding. Insight and data obtained from these sessions can be utilised by healthcare workers in order to find a solution to the correct feeding practices of mothers. Such research will contribute to easy identification of needs and more effective interventions that address the root of the problems.

## ACKNOWLEDGEMENTS

We would like to acknowledge the contribution of the biostatistician, Dr Sibanda, for his assistance.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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