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ARTICLE

The predictors of different measures of dietary diversity among one-year-olds in South Africa

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Objectives: A study was undertaken to compare a range of dietary diversity indicators and their predictors among one-year-olds.
Design: Multivariate regression analysis was employed, where dietary diversity indicators are the outcome variables and the main predictor variables are access to resources and maternal education. Three different dietary diversity indicators are analysed: a count of food items, a count of food groups and a Healthy Food Diversity Index.
Subjects and setting: The study included participants of Birth to Twenty Plus, a longitudinal cohort study of children born in 1990 in Johannesburg, South Africa ($n = 1\ 030$).
Results: There is a low correlation between measures of dietary diversity based on simple counts of food items/groups and the Healthy Food Diversity Index. Further, the predictors differ depending on which type of indicator is used. Access to resources (measured by an asset index) was found to be associated with an increase in counts of food items/groups but at a decreasing rate, while the opposite was found for the Healthy Food Diversity Index. There was no significant association between maternal education and the counts of food items/groups, while maternal education was positively associated with the Healthy Food Diversity Index.
Conclusions: More sophisticated measures of dietary diversity that also capture the healthiness of foods and their distribution in the diet, rather than just the number or variety, may be useful in understanding dietary patterns among children and what influences them. Maternal education appears to be particularly important for healthy food consumption among young children, while access to resources has a more complex association, with differential results at low and high levels.

Keywords: children, dietary diversity, maternal education, socioeconomic status, South Africa

Introduction

In South Africa a high prevalence of stunting among children persists and there is a staggering increase in obesity starting in early childhood and rising throughout the life-course. This double burden of malnutrition is worrying due to its impact on children's development and the risk of non-communicable diseases later in life.[1,2] The low-diversity maize-based diet common among poorer households in South Africa[3,4] is likely to be a factor, as is the increase in the consumption of processed foods with high fat and added sugar contents observed in urban areas in particular.[5] It is important therefore to understand what contributes to healthy eating and appropriate diets, especially among children, who have been found to have little variety in their diets.[6]

A common approach is to use a measure of dietary diversity as a proxy for the quality of an individual's diet, as a greater variety of foods is considered important for health outcomes.[7,8] The two measures most commonly used to capture dietary diversity in developing countries, given their relative simplicity, are counts of food items, typically referred to as the Food Variety Score, and counts of food groups, such as the Women's Dietary Diversity Score or the WHO's Dietary Diversity Score for children aged 6–24 months.[9–13] These various indicators have been found to predict, for example, nutrient adequacy, intakes of fats and sugars, and self-reported health status among adults,[14,15] and nutrient adequacy and height-for-age/weight-for-age among children.[16,17]

However, there are a number of concerns with these indicators of dietary diversity, of which we highlight two in this paper.[10,18,19] The first is that simple counts of food items/groups consumed make no distinction between healthy and unhealthy foods. For example, the Food Variety Score would increase if a person began to consume either vegetables *or* sweets, all else held constant. This can be especially problematic because counts of food items will vary based on the idiosyncrasies of the items included in the questionnaire. Individual dietary diversity scores based on counting food groups try to capture nutrient adequacy to some extent by counting only food groups that are considered important for healthy eating.[12,13] So, for example, the WHO's child-specific dietary diversity index excludes the categories for sweets/biscuits, spices/condiments and oils/fats. However, as with the Food Variety Score, food group counts do not take into account the relative healthiness of different food groups. A second concern is that simple counts of food items/groups do not reflect the distribution of consumption across the items/groups. For example, a child whose diet is made up of 80% of one item/group and 20% of the others will have the same score as a child whose diet is more evenly distributed across the items/groups.[10]

As an alternative to these more commonly used measures, some researchers have attempted to weight the foods consumed according to frequency/portion size and assumed nutrient density.[9] The Healthy Food Diversity (HFD) index created by Drescher *et al*. (using data from Germany) is a good example of this.[10] Their weighted index factors in both the healthiness of foods consumed and the distribution of consumption across the various groups. They found the index to be more strongly associated with nutrient supply and a range of biochemical parameters (such as high-density lipoprotein cholesterol) than the simple count indices described above.

This paper contributes to the literature by exploring the predictors of dietary diversity among one-year-olds in South Africa using these multiple measures of dietary diversity. In addition to the more commonly used food item and food group counts, we use a more sophisticated measure based on Drescher *et al.*'s HFD index, which takes into account the healthiness of foods consumed and the distribution of consumption.[10] In estimating the predictors of dietary diversity, we are particularly interested in how access to resources and mother's education are related to the child's complementary feeding diet, and whether the associations differ depending on the dietary diversity measure used.

We draw on previously unexplored data from the Birth to Twenty Plus (Bt20+) cohort study to examine these issues. Detailed information was obtained on children's eating patterns at one year, using a food frequency questionnaire (FFQ) administered to caregivers. The timing of the questionnaire is fortuitous, as we can gain some sense of what children were eating at a very sensitive stage in their development, when linear growth faltering often takes place.

Methods

Data and sample

Bt20+ is a birth cohort study of children born in 1990 in the greater Johannesburg–Soweto metropolitan area ($n = 3\ 273$). The Bt20+ enrolment process and sample characteristics have been documented in detail elsewhere.[20,21] In brief, recruitment involved all births that took place over a seven-week period in 1990, where the mother and baby were still resident in the Johannesburg–Soweto area six months post-delivery. The cohort was sociodemographically representative of the resident population of Johannesburg–Soweto at the time of recruitment. Consent was obtained from the biological mother and re-consenting took place at every data-collection wave. Participants were seen at 6, 12, 24, 48 and 60 months within the first five years of the study, with information collected on approximately 1 500–2 200 participants in any one wave.[20] Ethical clearance was granted by the Human Ethics Research Committee at the University of the Witwatersrand (No. 8/11/89).

Of the initial recruited cohort, a food frequency questionnaire (FFQ) was administered to 1 546 children at one year. A comparison of the initial sample of children with the year one sample shows no significant difference between the two groups on key variables such as the child's sex, birthweight and gestational age. A large part of the attrition in the early period was due to the return to rural areas of a number of mothers who had likely travelled to the city to give birth in better health facilities.[18] The remaining sample of children is most closely representative of those who were born in the city and who remained urban-dwellers in the first years of their life. Once missing data on the predictor variables are taken into account, we are left with an analytical sample of 1 030 children.

The FFQ was developed as a dietary assessment tool after examination of the literature and a validation study conducted by Margetts *et al.*[22], and was considered the most appropriate method at the time for a large-scale study such as Bt20 conducted in a culturally diverse population.[23] The FFQ was designed to ensure the most common local foods consumed by infants/children were captured, with information collected on the frequency of consumption of 149 items across a wide range of food groups such as cereals, vegetables, fruits, starches, proteins and other assorted foods. For each of 149 food items listed in the survey, caregivers were asked to indicate the frequency of the child's consumption using the following response options: 'never/seldom', 'once/month', '2–3/month', '1/week', '2–4/week', '5–6/week', 'once/day', and '2 or more/day'. While a specific recall period was not indicated, the intention was to collect information on the complementary feeding diet at one year and, given the frequency options provided, one could assume that caregivers would have been thinking about the previous month's consumption.

Measures of dietary diversity

We used the FFQ data to produce three dietary diversity indicators: a Food Variety Score, a Dietary Diversity Score, and the Healthy Food Diversity index. The Food Variety Score (FVS) is the simple summation of the number of different food items consumed by the child at least once a week.[6,9] The Dietary Diversity Score (DDS) is a count of food groups, and is based on the WHO's Dietary Diversity Score for 6–24-month-olds.[13,24] There are seven food groups, namely, grains, roots and tubers; legumes and nuts; dairy products; flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin-A rich fruits and vegetables; and other fruits and vegetables. If any one item in a group was reported to be consumed at least one a week, the child received a positive score for that group.

As described above, these indicators do not make any distinction between the relative healthiness of foods consumed, nor do they take into account the distribution of consumption across the food items or groups. To account for these two factors, we used the methods described in Drescher *et al.*[10] to create a version of the Healthy Food Diversity (HFD) index. The HFD index is a composite measure equal to the product of the Berry Index (BI), a measure of diversity that incorporates the number and distribution of different food groups, and the Health Value (HV), a measure of the healthiness of the food groups consumed.

$$\mathrm{HFD} = \mathrm{BI} \times \mathrm{HV} \quad (1)$$

where,

$$\mathrm{BI} = (1 - \Sigma s_i^2) \quad (2)$$

$$\mathrm{HV} = \Sigma(hf_i\ x\ s_i) \quad (3)$$

and

s_i = the share of each food group *i*'s consumption relative to total consumption;

hf_i = the health factor for each food group *i*.

Practically, this involves first sorting food items into groups. We followed Drescher *et al.*'s categorisation as closely as possible and divided food items into 12 groups, namely: vegetables and fruits; wholemeal products; potatoes; white-meal products; snacks and sweets; fish and low-fat meat; low-fat dairy; dairy; meat products and eggs; bacon; margarine and butter; and oils.[10] The relative shares (out of total consumption) of each group were then squared and summed to create the BI, which is a measure of how evenly distributed an individual's consumption is across groups. Because the FFQ in Bt20+ did not collect any information on the weight or portion size of consumed foods, the shares of total consumption (s_i) for each group were calculated based on the frequency of consumption over a weekly period. So, for example, if the child ate white-meal products once a week, he/she received a value of 1 and if he/she ate white-meal products once a day, then the value was 7. For a set overall level of consumption, the BI is at its maximum if consumption is evenly distributed across groups. In other words, if the BI is equal to 0, it implies the child's diet consisted of only one food group; if the BI is equal to 1 – 1/n it indicates that the child consumed equal shares of all food groups.

Of course, it is not desirable for children to consume equal shares of all food items, which is why the BI is multiplied, or weighted, by the HV. Simply put, the shares of total consumption for each group (s_i) were multiplied by their respective health factors (hf_i) and summed, yielding the HV index. The maximum possible value for the HV would be attained if the child eats only the group with the highest health factor (i.e. vegetables and fruits: $hf_i = 0.2628$) and the HV is divided by this maximum so that it is bounded between 1 and nearly 0. The health factors created by Drescher *et al.* were based on the proportional recommendations in nutrition wheels and food pyramids from the German Nutrition Society,[10] which we deemed sufficiently universal to be applied to children in the South African context. These are shown in Supplementary Table 1.

Data analysis

We described and compared the three different indices using simple summary statistics (means, standard deviations, minima and maxima), as well as pairwise correlations. To estimate the predictors of these three different measures of dietary diversity in the multivariate context, we used ordinary least squares (OLS) regression analysis. We also produced results for each of the two components of the HFD, namely the HV and the BI, to identify which of these two aspects – healthiness or distribution of consumption – is driving the overall results.

Our choice of predictors was based on a reading of the literature and availability of data in the survey. We were particularly interested in the associations between the dietary diversity of the child and both maternal education and the household's access to resources. Access to resources was captured by an asset index, constructed as a simple count of six items: television, car, fridge, washing machine, phone and home ownership. This variable was entered in the quadratic form in the regressions, given that existing research on nutrition transitions suggests access to resources might have a non-linear relationship with eating patterns.[5,25] Nutrition transitions are believed to have different phases, with consumption of unhealthier foods high in fat and sugars, for instance, initially increasing as access to resources increases, and then declining as the wealthy move on to healthier diets.[4,25] Controlling for access to resources, maternal education is expected to be positively associated with dietary diversity, and particularly with the HFD index, as more educated mothers may know how to provide their children with more diverse and healthier diets.[15,26]

In the regressions we controlled for the sex of the child, the mother's age, birth order and birth spacing (measured by an indicator for whether another child was born within 24 months of the surveyed child). These latter variables capture information concerning the number and order of siblings in the household and proxy for intra-household competition for food and mother's attention.

We also controlled for breastfeeding duration, as it is possible that children's diets might differ depending on whether or not they are still being breastfed. As recommended by the WHO[13] in its guidelines on assessing infant and young child feeding practices, dietary diversity scores should focus on the complementary feeding diet, with information on breast/bottle feeding captured in separate questions and described using separate indicators. Information on breastfeeding and formula feeding was captured separately in the Bt20+ questionnaire, but unfortunately there were a lot of missing values on many of the variables and it proved difficult to capture information on the intricacies of breast vs. formula feeds (quantity and frequency) with interview questions asked at discrete time points. The most reliable measure we have is the 'duration of breastfeeding', which we include as a series of dummy variables for not breastfed, breastfed for 0–6 months, for 6–12 months and for more than 12 months. We also know from the survey that by 9 months, 99.14% of the sample of children had been introduced to solids, with the remaining few introduced to solids by 12 months.

Results

Table 1 presents the summary statistics for the outcome and predictor variables for the analytical sample of children who had non-missing data on the dietary diversity measures and the predictor variables ($n = 1\ 030$). The mean of the FVS indicates that children in the sample consumed an average of 32.8 (SD = 10.32) of the 149 different food items a week, while the mean of 6.5 (SD = 0.81) for the DDS indicates that in a week children ate on average at least one food item from almost all the 7 food groups. The mean HFD score was 0.08 (SD = 0.01) with scores ranging from 0.03–0.13 (with the theoretical minimum and maximum being 0 and 0.92, respectively).

To test whether missing data are of concern, we compared means of the analytical sample with the total sample for which the variable was defined. For all three dietary diversity indicators, the analytical sample ($n = 1\ 030$) had slightly higher mean values than the sample of children that had FFQ information but were omitted because of missing predictor variable information ($n = 516$), but in two-sided t-tests the differences in means were not significant at the 1% or 5% levels. Of the predictor variables, mean years of mother's education in the analytical sample was marginally higher than for those in the omitted sample (9.86 vs. 9.39, $p < 0.001$), as was birth order (2.17 vs. 2.02, $p < 0.001$) and the duration of breastfeeding (12.81 vs. 9.12, $p < 0.001$).

Table 2 shows the pairwise correlation coefficients between the dietary diversity measures. There is a strong positive correlation between the two count indices, the FVS and the DDS ($r = 0.52$, $p < 0.001$), but no significant correlation between the FVS and the HFD ($r = -0.03$, $p = 0.35$), and a low correlation between the DDS and the HFD ($r = 0.07$, $p = 0.03$). These correlations confirm that the different types of dietary diversity indicators are picking up different aspects of the child's diet. The pairwise correlations for the subcomponents of the HFD indicate that the HFD index is heavily influenced by the HV or healthiness subcomponent ($r = 0.97$, $p < 0.001$) and much less so by the BI or distribution subcomponent ($r = -0.12$, $p < 0.001$). Interestingly, the BI is positively correlated with both the FVS and the DDS, while the HV is negatively correlated with the FVS and not significantly correlated with the DDS.

Table 1: Summary statistics for outcome and predictors variables ($n = 1\ 030$)

Factor	Mean (%)	Standard deviation	Minimum	Maximum
Outcome variables:				
FVS	32.79	10.32	6	73
DDS	6.52	0.81	2	7
HFD	0.08	0.01	0.03	0.13
BI	0.84	0.04	0.63	0.93
HV	0.10	0.02	0.04	0.20
Predictors:				
Asset index	2.82	1.67	0	6
Maternal education (years)	9.86	2.80	0	14
Female	51.65	–	0	1
Maternal age	25.72	6.05	14	43
Birth order	2.02	1.05	1	4
Birth spacing (sibling born within 24 months)	0.06%	–	0	1
Never breastfed	4.95%	–	0	1
Breastfed 0–6 months	29.51%	–	0	1
Breastfed 6–12 months	14.76%	–	0	1
Breastfed >12 months	50.78%	–	0	1

Notes: FVS = Food Variety Score; DDS = Dietary Diversity Score (WHO); HFD = Healthy Food Diversity Index; BI = Berry Index; HV = Health Value.

Table 3 presents the regression results. With regard to the main predictors of interest, the results for the FVS and the DDS are similar to each other. The asset index is positively associated with both the FVS ($B = 1.72$, $p = 0.01$) and the DDS ($B = 0.12$, $p = 0.02$), while the squared asset term is negatively associated with both indices (FVS: $B = –0.23$, $p = 0.03$; DDS: $B = –0.03$, $p = 0.01$). This highlights the non-linear relationship; children in better-off households consume greater numbers of food items or food groups, but this effect lessens as assets rise further (with turning points for the FVS and DDS at 3.72 and 2.13 assets respectively). There is no significant association between mother's education and the FVS ($B = 0.07$, $p = 0.57$) or the DDS ($B = 0.01$, $p = 0.20$), using $p < 0.1$ as the cut-off. Of the other control variables, mother's age is negatively associated with the FVS ($B = –0.17$, $p = 0.02$), while birth order is positively associated with the FVS ($B = 1.01$, $p = 0.02$).

The results for the HFD index are very different. The asset index and its square have the opposite signs compared with the FVS/DDS coefficients. The asset index is negatively related to the HFD ($B = –0.002$, $p = 0.09$) while its square is positively related ($B = 0.0003$, $p = 0.06$). The regressions for the two subcomponents of the HFD (in Columns IV and V) indicate that this result is being driven by the HV, or healthiness of the foods consumed, rather than the BI, i.e. the distribution of their consumption. The coefficients on the asset index and the asset index squared for the HV are –0.003 ($p = 0.02$) and 0.0005 ($p = 0.01$) respectively. In other words, increasing assets are initially associated with less healthy food consumption among children, but as assets increase further this negative effect lessens (and becomes positive at 1.5 assets for the HV). Maternal education is positively associated with the HFD ($B = 0.0004$, $p = 0.02$), with moreeducated mothers providing their children with healthier foods to eat. None of the other control variables are significantly associated with the HFD.

Discussion

This paper analysed the predictors of three different measures of dietary diversity for a sample of one-year-olds in South Africa. In addition to the more commonly used food item count (FVS) and food group count (DDS), a key contribution of the work was to calculate Drescher *et al.*'s HFD index,[10] a more sophisticated measure of dietary diversity taking into account both the healthiness of foods consumed and the distribution of consumption. Comparisons of the various measures indicated a high correlation between the two simpler count measures, but low and insignificant correlations between the FVS/DDS and the HFD. This highlights that the more detailed HFD is capturing different information regarding the child's diet compared with the simple count measures.

Table 2: Pairwise correlations between dietary diversity indicators

Indicators	1. FVS	2. DDS	3. HFD	4. BI	5. HV
1. FVS	–				
2. DDS	0.520 (< 0.001)	–			
3. HFD	–0.029 (0.352)	0.069 (0.027)	–		
4. BI	0.175 (< 0.001)	0.289 (< 0.001)	–0.115 (< 0.001)	–	
5. HV	–0.076 (0.015)	–0.006 (0.845)	0.965 (< 0.001)	–0.358 (< 0.001)	–

Notes: For all pairwise correlations, $n = 1\ 030$ p-values are in parentheses
FVS = Food Variety Score; DDS = Dietary Diversity Score (WHO); HFD = Healthy Food Diversity Index; BI = Berry Index; HV = Health Value.

Table 3: Multivariate regressions (OLS coefficients)

Predictors	I: FVS			II: DDS			III: HFD			IV: BI			V: HV		
	B	*se*	*p*	*B*	*se*	*p*	*B*	*se*	*p*	*B*	*se*	*p*	*B*	*se*	*p*
Asset index	1.724***	0.649	0.008	0.115**	0.050	0.023	−0.002*	0.001	0.088	0.006**	0.002	0.019	−0.003**	0.001	0.020
Asset index squared	−0.232**	0.107	0.031	−0.027***	0.008	0.001	0.0003*	0.0002	0.056	−0.001***	0.0004	0.003	0.001***	0.0002	0.008
Maternal education	0.075	0.130	0.566	0.013	0.010	0.196	0.0004**	0.0002	0.024	0.001	0.001	0.333	0.001*	0.0002	0.050
Female	0.393	0.646	0.543	0.093*	0.050	0.064	−0.001	0.001	0.404	0.004*	0.002	0.089	−0.001	0.001	0.266
Maternal age	−0.170**	0.073	0.020	0.004	0.006	0.495	0.0001	0.0001	0.491	−0.0004	0.0003	0.105	0.0001	0.001	0.348
Birth order	1.009**	0.433	0.020	−0.008	0.034	0.821	0.0002	0.001	0.754	0.002	0.002	0.135	−0.000	0.001	0.991
Birth spacing	0.597	1.367	0.663	0.093	0.106	0.380	−0.0004	0.002	0.818	−0.001	0.005	0.796	−0.001	0.003	0.795
Breastfed 0–6 months	1.017	1.563	0.515	0.083	0.121	0.497	−0.001	0.002	0.623	0.007	0.006	0.224	−0.002	0.003	0.437
Breastfed 6–12 months	0.541	1.667	0.746	0.080	0.129	0.539	0.001	0.002	0.700	0.003	0.006	0.673	0.001	0.003	0.803
Breastfed > 12 months	0.803	1.519	0.597	0.152	0.118	0.198	−0.0003	0.002	0.903	0.002	0.005	0.767	−0.001	0.003	0.841
Constant	30.995***	2.544	0.000	6.106***	0.198	0.000	0.079***	0.004	0.000	0.838***	0.011	0.000	0.094***	0.005	0.000

Notes: For all regressions, $n = 1\,030$. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Omitted categories are 'male', 'never breastfed' and 'sibling not born within 24 months'.
FVS = Food Variety Score; DDS = Dietary Diversity Score (WHO); HFD = Healthy Food Diversity Index; BI = Berry Index; HV = Health Value.

This was confirmed in the regression analysis, which showed that different variables predict the FVS and DDS compared with the HFD. A particularly interesting finding was that access to resources was related to the different dietary diversity indicators in the opposite direction. We included the asset index in the quadratic form to capture the non-linear relationship discussed in the literature on nutrition transitions.[4,5,25] As assets increase initially, the FVS/DDS scores rise, but this effect lessens as assets increase further. In contrast, the HFD score declines as assets increase initially, but this decline is attenuated (and eventually reverses) as assets increase further. This result is being driven by the health factor component (HV) rather than the distributional component (BI) of the HFD index.

International reviews of the empirical literature suggest a positive association between socioeconomic status (SES) and dietary diversity, and the healthiness of the diet more specifically.[25,27] Studies focusing on developing countries have also found higher SES to be associated with greater dietary diversity among both adults[15,28,29] and children.[30–32] However, these studies used simple counts of food groups or items to measure diversity. Also, measures of SES were included in the linear form, and our findings suggest that the non-linear form may be more appropriate as there may be differential effects on dietary diversity at low and high SES levels. The insights from the nutrition transition research certainly suggest this. Energy-dense foods are generally a cheaper way of meeting energy intakes and providing a sense of satiation, with the costlier, more nutritious foods often inaccessible to lower SES households.[27] Increases in economic resources at lower levels therefore may lead to an increase in the quantity and diversity of foods consumed, but not necessarily the healthiness of the foods.[25] Only at higher levels of SES can the substitution of healthier micronutrient-rich foods for energy-dense foods take place.

Another key finding was that, while mother's education was not significantly associated with the simpler FVS or DDS, it was positively associated with the HFD. This highlights that more educated mothers are able to provide their children with healthier diets. There are some mixed findings in the literature with regard to mother's education and child dietary diversity measured by food group counts, with most studies finding a positive association,[30,32–37] but a few finding no association.[31,38] Again, however, we could not find any studies that explored the predictors of more complex weighted indices such as the HFD for children in this age group. Nonetheless, our finding of a positive association between maternal education and the HFD is in line with other literature on child outcomes, which finds, for example, that children with more educated mothers have lower intakes of fats and sugars[39] and a lower likelihood of stunting.[26,40,41] This is a particularly important finding for South Africa, where the majority of children live with their mothers (and only 30% live with their father resident in the household).[42,43]

There is a dearth of research investigating the predictors of dietary quality among children in the sensitive early stages of the child's development, in developing countries more generally and in South Africa specifically. Using South African data, this study demonstrated the need for more sophisticated measures of dietary diversity to better understand the *healthiness* of children's diets and the factors correlated with healthier food consumption. Nonetheless, there were limitations to the work. In replicating the index used by Drescher *et al.*, we used the German dietary guidelines to assess the healthiness of different food groups.[10] While these are likely to be universally applicable to a large extent, future research could consider creating updated health factors that are more specific to South African children. Another limitation is that, although we know the frequency of consumption of various food items (which allowed us to incorporate the distribution component in the HFD), we do not have information on the quantity consumed or portion sizes, which are notoriously difficult for mothers to quantify. The implication is that we cannot relate dietary diversity to indicators of macro- and micronutrient status. Lastly, our results are based on an urban child cohort study. Given the poorer child health outcomes documented in rural areas in South Africa[28] and the changing dietary patterns observed in urban and rural areas,[4,5] further data collection on young children in both area types is necessary. These efforts should ensure that information is collected on the number, types and quantities of foods consumed within a specified recall period, as well as on concurrent breast/bottle-feeding.

Conclusions

Understanding the complementary feeding diet over a period when growth faltering is common is necessary to identify interventions to optimise growth, health and development. In conclusion, measuring infant dietary diversity in a more sophisticated manner is important as a research and evaluation tool. Furthermore, it can be used as a lever to promote healthy diet diversity in the infant by supporting parents to understand and implement such practices.

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