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ARTICLE

Breakfast and lunchboxes provided to foundation phase learners: do caregivers' knowledge and attitude reflect their practices?

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Background: This study was conducted to determine nutritional knowledge, and to identify whether caregivers' knowledge and attitudes related to their breakfast and lunchbox food-providing practices.
Methods: A cross-sectional descriptive study was conducted. Questionnaires were used to collect the data. The study population included 1286 caregivers of foundation phase learners in Quintile 5 schools from Bloemfontein, South Africa.
Results: The median score for knowledge regarding breakfast and lunchboxes of caregivers was 55.6% and 73.1%, respectively. Knowledge on breakfast and lunchbox foods was higher for caregivers older than 35 years (breakfast median 55.6, $p = 0.0479$ and lunchbox median 76.9, $p < 0.0001$) and who possessed a tertiary qualification (breakfast median 55.6, $p = 0.0009$ and lunchbox median 76.9, $p < 0.0001$). The attitudes of caregivers were generally positive towards providing healthy breakfast and lunchbox foods (breakfast median 71.4% and lunchbox median 82.5%). The primary objective of caregivers' provision of a lunchbox was health considerations ($n = 658$, 54.2%) followed by being filling ($n = 277$, 22.8%). The median score to rate the provision of healthy breakfast foods was 26.7% and 35.6% for lunchbox foods. Healthier breakfasts and lunchboxes were provided by caregivers with a tertiary qualification.
Conclusions: A need to educate caregivers on the provision of healthy breakfast and lunchbox foods has been identified.

Keywords: breakfast, lunchbox, caregivers, foundation phase learners, knowledge, attitudes, practices

Introduction

Children depend on their caregivers to provide them with food and cannot independently determine what they eat.[1] It is therefore important to investigate the knowledge, attitudes and practices (KAP) of caregivers regarding food when addressing the eating patterns of children.

Foundation phase learners are regarded as a nutritionally vulnerable group, because of the impact of nutrition on growth and development and nutrient needs.[2] Periods of rapid growth can be challenging, especially as young children cannot provide for themselves.[3] Inadequate nutrient intake is often the result of various socio-economic factors, the food choices children and their caregivers make, and not eating meals together as a family.[4]

Caregivers play a multifaceted role in influencing the eating habits of children by determining what is offered, by purchasing specific types of food, setting an example as role models, their interaction with children during mealtimes and by exerting 'parental control'.[5,6] Even though peer pressure plays a role in the choice of food (positive or negative) learners take to school, caregivers still have the opportunity to decide which foods to provide.[7] It is therefore necessary to acknowledge the role of caregivers' food choices in children's attitudes towards food.[6,8]

Various studies have confirmed the importance of informing and educating caregivers about healthy eating and its health benefits.[9,10] Bogl *et al.*[11] emphasised the vital role that the home environment plays in shaping a child's eating behaviour and food choices. The emphasis should be on encouraging better food choices, even when limited resources are available, to prevent the development of various forms of malnutrition.[12]

Factors that typically influence the food selection of caregivers include age, marital status, level of education and employment status.[13] Research has indicated that caregivers' nutritional knowledge[9,14,15] and opinions[3,10] affect the types of food they provide to the children in their care. However, in a study by Williams *et al.*[15] among mothers with children between the ages of 5 and 12 years from a low socio-economic setting, no association was found between caregivers' nutritional knowledge and their practices.

Even though several studies have emphasised the importance of a healthy breakfast before school[16–20] and made clear recommendations on what should be included in a child's lunchbox,[21–23] few studies have examined the relationship between the KAP of caregivers and the food they include in the lunchboxes of children in their care. Vereecken and Maes[13] conducted a study to assess the nutritional knowledge and attitudes of mothers and its effect on children's (3–4 years old) food intake. They concluded that it is important to be aware of the nutritional knowledge and attitudes of mothers to facilitate more effective nutrition interventions to improve the nutrient intake of children.[13]

When parents understand the importance of optimal nutrition, they can improve their child's nutritional knowledge by discussing healthy eating habits.[21] Rao *et al.*,[21] however, stated that good nutritional knowledge does not necessarily lead to good dietary practices. Therefore, the aim of this study was to

examine the intention of caregivers to provide children in their care with a healthy breakfast and school lunchbox, and whether their knowledge influenced their practices.

Materials and methods

Study sample

This study included Quintile 5 primary schools in Bloemfontein, South Africa, to enable comparison with results from European and American studies. A quintile classification is used by the South African Department of Basic Education to rank schools according to socio-demographic status. Quintile 1 schools have the highest poverty level, while Quintile 5 schools have the lowest poverty level.[23] Quintile 1–4 schools include learners from more disadvantaged areas and typically make use of the National School Nutrition Programme (NSNP),[23] therefore fewer learners from these schools would take a lunchbox to school.

Fifteen (37.5%) of the 40 primary schools approached to participate in the study granted permission for the study to be conducted at their schools. The caregivers of all foundation phase learners (Grades 1–3) at these schools were invited to participate in the study. Of the 3 198 learners attending the foundation phase classes (age 6–12 years) at the 15 schools, 1 286 caregivers (40.2%) consented to participate in the study and completed the questionnaire.

Questionnaire

Data collection was done by means of a printed copy of a questionnaire that was distributed to caregivers at the participating schools. A literature search identified relevant questions from other studies, focusing on nutritional knowledge and/or attitudes and/or practices of learners and/or caregivers. Four dietitians and a biostatistician evaluated and approved the questionnaire for content validity. A pilot study was conducted among caregivers at one of the participating schools to test all procedures and reliability. No significant changes were made to the questionnaire and the results obtained from the pilot study were included in the final study.

Consenting caregivers of children who attended the participating schools completed the questionnaire, which consisted of three parts. Part 1 of the questionnaire assessed caregiver KAP regarding breakfast, Part 2 of the questionnaire assessed caregiver KAP regarding lunchbox foods, and Part 3 collected data on the socio-demographic status of the caregiver.

A food frequency table was included to evaluate the nutritional adequacy of breakfast and lunchbox foods provided by the caregiver. The nutritional adequacy of the breakfast[19,20,24] and lunchbox foods[16,5–31] was evaluated according to guidelines on food groups that should be included for breakfast and lunchboxes. Food provided to children before school and taken to school were assessed. The food items included in the food frequency table were foods regarded as healthy breakfast and lunchbox options, as well as alternatives generally available for breakfast and lunchboxes. The frequency of use was indicated as the number of days (0–5) consumed during a school week. Twelve questions collected data on the nutrition practices of the caregiver.

The caregiver's attitudes towards a healthy breakfast and lunchbox were assessed by 15 questions (Table 1), where participants could indicate whether they completely agree, agree, sometimes agree, sometimes disagree, disagree, or completely disagree with given statements.[32] A positive attitude of the caregiver was regarded as a score of 3–5 and a negative attitude as a score of 0–2.

To obtain data on the knowledge of the caregiver, 21 questions were included (Table 2) and one point was allocated for each correct answer. If more than one correct answer was possible, one point was allocated for each correct answer. Missing answers, omitting questions and 'uncertain' answers were scored as zero.

Data analysis

Data were captured in duplicate and verified, after which the data were analysed by the Department of Biostatistics at the University of the Free State using Statistical Analysis System SAS® software (SAS Institute, Cary, IN, USA), version 9.4.[39] In this study, the caregiver's level of education was classified as low (secondary level education) or medium/high (tertiary level education). To determine associations between variables, income was grouped as low (≤ R20 000 (± US $1 380) per month) and high (> R20 000 (± US $1 380) per month). Taking the exchange rate at the time of the study into account, approximately R14.49 (South African rand; ZAR) was equal to US $1 (US dollar). Marital status was grouped as living with a life partner and other. When grouping the age of caregivers, younger or equal to 35 years and older than 35 years were used, similar to Vereecken and Maes.[13]

Categorical variables were reported by frequencies and percentages and continuous variables by medians, minimum, maximum or percentiles. Differences between groups were compared using the Wilcoxon two-sample test for unpaired data or the chi-square test. Findings were regarded as statistically significant at a p-value of < 0.05.

Ethical considerations

The Department of Basic Education provided approval for the study to be conducted in the identified schools. Ethics approval

Table 1: Statements included in the questionnaire to assess caregivers' attitudes towards breakfast and lunchboxes

Questionnaire item and reference numbers
Is it important to eat breakfast?[13,28]
You do not give your child breakfast because there is not enough time.[13,3]
You do not give your child breakfast because it is too expensive.[13,33]
You do not give breakfast to your child because he/she does not want to eat.[13,33]
You give your child breakfast because it is important for their health.[19,33,34]
You give your child breakfast because it is important for concentration.[19,33,34]
You give your child breakfast because you grew up eating breakfast.[19,33,34]
You give your child breakfast because your child asks you to have breakfast.[19,33,34]
Healthy food packed into a lunchbox would help reduce the risk of your child developing certain diseases.[13]
A healthy lunchbox does not help my child to concentrate at school.[13]
To prepare a healthy lunchbox is an extra workload.[13]
I seldom read the food label before I buy a new food item.[13]
Healthy food is more expensive than less healthy food.[13]
In general, healthy food is tasty.[13]
It is important to have healthy eating habits.[13]

Table 2: Questions and statements included in the questionnaire to assess caregivers' nutritional knowledge

Questionnaire item and reference numbers
What type of milk and milk products are the healthiest for your child?[35]
Skipping breakfast is good for your child's concentration at school.[20,23]
Eating breakfast will make you gain weight.[19,20]
It is important that breakfast foods contain fibre.[20]
It is important to eat fruit with breakfast.[36]
Breakfast is important for growth and development.[37]
Is it important for your child to eat the food in his/her lunchbox?[38]
Why is it important to pack a school lunchbox?
Does eating fruits and vegetables daily assist in reducing the risks of developing certain diseases?[23,38]
How many helpings of fruit and vegetables should your child eat every day?[38]
Are foods that contain fibre (roughage) important in your child's diet?[38]
Which food do you regard as the healthiest?[23]
Can fats help with the absorption of certain nutrients?[23]
When you eat lots of fat and fatty foods, you can:[38] (Select *all* the appropriate answers.)
• Become fat/overweight
• Concentrate better
• Feel more energetic
• Get high blood pressure
• Get a heart attack
• Get diabetes
Do chips contain healthy fats?[23]
Do nuts contain healthy fats?[23]
Do avocado pears contain healthy fats?[23]
Eating a lot of sugar, candy, and sweet foods:[38] (Select *all* appropriate answers)
• Is good for health
• Can make you fat
• Is bad for your teeth
• Can cause diabetes
Select *all* the food group/s that contain *fibre* (roughage).[38]
• Meat, fish and chicken
• Dairy
• Fruits
• Vegetables
• Unrefined starchy foods/carbohydrates
• Beans and lentils
• Fats
Do biscuits/cookies contain healthy fats?[23]

was granted by the Health Sciences Research Ethics Committee of the University of the Free State (reference number: UFS-HSD2017/1093) after permission was obtained from the school principals and governing bodies to conduct the study at their schools. Caregivers were invited to participate and were aware that consent was implied by completing the questionnaire. No personal identifiers or names were noted on the questionnaires, thereby ensuring that study participants remained anonymous and information was kept confidential.

Results

Study population

Of the 3 198 caregivers invited, 1 286 agreed to participate in the study, resulting in a response rate of 40.2%. Caregivers with more than one child in the foundation phase of the school completed only one questionnaire for the oldest child in the household.

The mean age of the caregivers was 38.6 years, with a standard deviation (SD) of 6.99. The learners represented by the caregivers had a mean age of 7.7 years (SD 1.00). The gender distribution of learners included more males ($n = 653$, 51.9%). The majority of caregivers who participated were the mother of the learner ($n = 1\,077$, 84.8%), followed by the father ($n = 125$, 9.8%). Most caregivers ($n = 1\,001$, 79.8%) were living with a life partner, and 253 (20.2%) reported being single, divorced or separated. The caregivers included 386 (30.9%) with a secondary qualification or less, and 863 (69.1%) with a tertiary qualification. Most of the caregivers ($n = 761$, 61.0%) were employed full-time (working > 35 hours per week); 584 (53.9%) had an income of > R20 000 (± US $1 380) per month. The median knowledge scores obtained by the caregivers were 55.6% for breakfast and 73.1% for lunchboxes.

Breakfast practices

The median score for providing a healthy breakfast was 8 out of a maximum score of 30 (26.7%).

The majority of the caregivers ($n = 1\,043$, 81.7%) provided children with breakfast before school every day, while 63 (4.9%) did not provide breakfast before school. Less than a third ($n = 389$, 32.0%) of families mostly ate breakfast together during the week. Caregivers older than 35 years tended to eat meals more regularly together as a family ($n = 270$, 32.3%) compared with caregivers younger than 35 years of age ($n = 118$, 29.7%, $p = 0.356$). Significantly more ($p < 0.005$) caregivers older than 35 years provided breakfast on every school day ($n = 700$, 83.8%), made use of low-fat milk and knew that fibre was an important component of breakfast foods, when compared with younger caregivers.

Caregivers mostly provided their children with tea ($n = 308$, 29.6%), water ($n = 307$, 23.9%) or juice ($n = 292$, 22.7%) for breakfast. Most learners received milk ($n = 965$, 75.0%) daily with breakfast, while less than a quarter ($n = 304$, 23.6%) received fruit daily with breakfast.

Ready-to-eat breakfast cereals (RTEBC) were the main type of cereal-based breakfast consumed, with Weet-Bix ($n = 660$, 51.4%), followed by Corn Flakes ($n = 575$, 44.8%) and oats ($n = 566$, 44.1%) being the most popular. The bread provided for breakfast was mostly brown and low GI bread ($n = 763$, 59.4%), with eggs ($n = 812$, 63.2%) and cheese ($n = 734$, 57.2%) as the most popular protein choices for breakfast (Table 3).

Lunchbox practices

Most of the caregivers ($n = 1\,224$, 95.7%) provided children with a lunchbox to take to school on a daily basis, while only 17 (1.3%) did not provide children with a lunchbox for school on any day of the week. Although caregivers older than 35 years were more knowledgeable about how many servings of fruits and/or vegetables should be eaten daily ($n = 223$, 27.3%), less than a quarter of the 1 286 caregivers ($n = 306$, 24.9%) knew that five portions of fruit and/or vegetables per day is recommended.

In all, 658 (54.2%) caregivers provided children with a lunchbox with the main intent that it should be healthy, 277 (22.8%) reported that their child's lunchbox contents should be

Table 3: Breakfast foods and beverages provided by caregivers (n = 1286)

Food/beverage type[a]	*n* (%)
Beverages:	
Water	307 (23.9)
Juice	292 (22.7)
Milk	195 (15.2)
Tea	308 (29.6)
Dairy 5 days/week	965 (75.0)
Fruit 5 days/week	304 (23.6)
Cereal:	
Oats[b]	566 (44.1)
Weet-Bix[b]	660 (51.4)
Cornflakes[b]	575 (44.8)
Bran flakes[b]	302 (23.5)
Bread:	
Brown or low glycaemic index (GI)[b]	763 (59.4)
White[b]	604 (47.0)
Protein-rich foods:	
Cheese[b]	734 (57.2)
Eggs[b]	812 (63.2)
Processed meat[b]	537 (41.8)
Sausage/mince[b]	546 (29.9)

[a]The four beverages and foods in each group that were most frequently provided were included in the table.
[b]Caregivers provided their children with the specific food item anything from one to five days in a school week. The caregivers were allowed to indicate more than one choice per week.

Table 4: Lunchbox foods and beverages provided by caregivers (n = 1286)

Food/beverage type[a]	*n* (%)
Beverages:	
Water[a]	1000 (77.9)
Juice[a]	745 (57.9)
Dairy[a]	547 (42.6)
Cool drink concentrate[a]	415 (32.3)
Fruit:	
5 days/week	431 (33.6)
1–4 days/week	561 (44.7)
Vegetables:	
5 days/week	54 (4.2)
1–4 days/week	423 (25.2)
Protein-rich food:	
Cheese[a]	797 (62.1)
Processed meat[a]	737 (57.4)
Red meat[a]	553 (43.1)
Pork[a]	212 (16.5)
Bread:	
Brown or low glycaemic index (GI)[a]	978 (76.2)
White[a]	726 (56.5)
Crackers:	
Savoury[a]	671 (52.3)
Low GI[a]	307 (23.9)
Sweet[a]	354 (27.6)
Muffin:	
Savoury/sweet[a]	363 (28.3)
Bran[a]	250 (19.5)
Bars:	
Seeded/granola/oats[a]	292 (22.7)
Fruit[a]	275 (21.4)
Energy[a]	159 (12.4)
Fast food[a]	248 (19.3)
Treats:	
Chips (hard)[a]	665 (51.8)
Dried fruit[a]	460 (35.8)
Candy[a]	480 (37.4)
Nuts[a]	412 (32.1)

[a]Caregivers provided their children with the specific food item anything from one to five days in a school week. The caregivers were allowed to indicate more than one choice per week.

'filling/satisfying', 85 (7.0%) wanted the lunchbox to be quick to prepare and 61 (5.0%) indicated that the food in the lunchbox should be affordable. Most caregivers restricted the child's tuck shop visits to one day per week or less (n = 1 124, 87.5%), with no significant association between the age of the caregivers and the provision of money for the tuck shop (Table 4).

Caregivers' intent was mainly to provide the children in their care with a healthy or filling lunchbox. Most caregivers provided water (n = 1 000, 77.9%), brown or low GI bread (n = 978, 76.2%) and cheese (n = 797, 62.1%), but did not include a fruit or vegetable in the school lunchbox on a daily basis (Table 3).

Associations between socio-demographic characteristics and the knowledge, attitudes and practices of caregivers

The median knowledge score of caregivers with a negative attitude towards breakfast (n = 29, 40.0%) was significantly lower ($p < 0.0001$) than caregivers with a positive attitude towards breakfast (n = 1 275, 68.6%). The same trend was seen with the median knowledge score of caregivers with a negative attitude towards healthy lunchbox foods (n 89, 51.4%) that was significantly lower ($p < 0.0001$) than caregivers with a positive attitude towards healthy lunchbox foods (n = 1 197, 71.4%).

Although the median knowledge scores for all the socio-demographic variables for breakfast (and family structure for lunchboxes) were the same, there were significant differences in the knowledge of caregivers older than 35 years and those with a tertiary qualification for both breakfast and lunchbox foods. Caregivers with an income of more than R20 000 (± US $1 380) per month, who lived in a family with support, had a significantly higher knowledge score for lunchbox foods only (Table 5).

The practice scores for both breakfast and lunchbox foods were significantly lower for the caregivers with an income of less than or equal to R20 000 (± US $1 380) per month, and who had a secondary qualification. Younger caregivers (≤ 35 years) had a significantly lower practice score for lunchbox provision than older caregivers (Table 6).

Most caregivers had a positive attitude towards providing breakfast and lunchbox foods. Caregivers with tertiary education ($p = 0.011$) and those earning more than R20 000 (± US $1 380) per month ($p = 0.009$) were more positive about healthy lunchbox foods than those with a lower level of education and earning less (Table 7).

Table 5: Knowledge of healthy breakfast and lunchbox food types according to caregivers' sociodemographic characteristics

	Knowledge score (%)							
	Breakfast				Lunchbox			
Caregivers' sociodemographic variables	**Median**	**LQ**	**UQ**	***p***	**Median**	**LQ**	**UQ**	***p***
Age:								
≤35 years	55.6	44.4	66.7	0.0479*	73.1	57.7	80.0	<0.0001*
>35 years	55.6	55.6	66.7		76.9	65.4	84.6	
Family structure:								
Single	55.6	44.4	66.7	0.0610	73.1	57.7	80.0	0.0002*
With support	55.6	55.6	66.7		73.1	61.5	84.6	
Qualification:								
Low (secondary)	55.6	44.4	66.7	0.0009*	69.2	53.8	76.9	<0.0001*
Medium-high (tertiary)	55.6	55.6	66.7		76.9	65.4	84.6	
Income:								
Low (≤R20 000/month)[a]	55.6	44.4	66.7	0.1639	73.1	57.7	80.8	<0.0001*
High (>R20 000/month)	55.6	55.6	66.7		76.9	69·2	84.6	

LQ = lower quartile of percentage; UQ = upper quartile of percentage.
[a]At the time of the study, R20 000 was equal to approximately ± US $1 380.
*Statistically significant difference.

Table 6: Breakfast and lunchbox scores according to caregivers' sociodemographic characteristics

	Practices							
	Breakfast				Lunchbox			
Caregivers' sociodemographic variables	**Median**	**LQ**	**UQ**	***p***	**Median**	**LQ**	**UQ**	***p***
Age:								
≤35 years	7.0	3.0	13.0	0.1034	15.0	8.0	21.0	< 0.0001*
>35 years	8.0	4.0	24.0		17.0	10.0	24.0	
Family structure:								
Single	7.0	3.0	13.0	0.1246	15.0	9.0	23.0	0.3549
With support	8.0	4.0	13.0		16.0	9.0	23.0	
Qualification:								
Low (secondary)	7.0	3.0	12.0	0.0013*	15.0	8.0	20.0	< 0.0001*
Medium-high (tertiary)	9.0	5.0	13.0		17.0	10.0	24.0	
Income:								
Low (≤ R20 000/month)[a]	7.5	3.0	12.0	0.0117*	15.0	8.0	23.0	0.0406*
High (> R20 000/month)	9.0	5.0	14.0		16.0	10.0	23.5	

LQ = lower quartile of percentage; UQ = upper quartile of percentage.
[a]At the time of the study, R20 000 was equal to approximately US $1 380.
*Statistically significant difference.

Discussion

Eating breakfast regularly is associated with adequate macro- and micronutrient intake,[4,24] improved food choices throughout the day,[20] cognition,[19,34,40,41] and psychosocial functioning.[40] In addition, children (aged 6–18 years) are more likely to be overweight and obese if they do not eat breakfast.[42] Not only breakfast, but also a healthy lunchbox snack/meal, is important for optimal health[43] resulting from the consumption of a wider variety of food and better weight management in children.[23]

This study investigated various socio-demographic factors that could influence the KAP of caregivers regarding breakfast and lunchboxes, and also whether their intent reflected in their practices.

Breakfast

A balanced breakfast should provide approximately a third of a child's daily requirements, and is recommended to consist of a fibre-rich carbohydrate, reduced-fat milk or milk product, fruit and a lean protein.[19,20, 4,28]

The median nutritional quality score (26.7%) of breakfast foods provided in our study was lower for caregivers with a lower qualification level and income. This is similar to the findings by Russell *et al*.,[44] who reported that parents with a lower qualification level included food types according to their children's preferences, as opposed to what is healthy.[44,45] The attitudes towards a healthy breakfast in our study were positive, with no differences in the attitudes between the different socio-demographic groups.

Research has shown that breakfast intake in foundation phase learners is better than that of adolescents.[42,46–48] In our study, most caregivers (*n* = 1 043, 81.6%) provided breakfast on every school day. Our finding was similar to other studies in the USA, reporting daily consumption of breakfast among

Table 7: Caregivers' attitudes towards providing breakfast and a lunchbox according to sociodemographic characteristics

	Attitude					
	Breakfast			Lunchbox		
Caregivers' sociodemographic variables	Positive (%)	Negative (%)	*p*	Positive (%)	Negative (%)	*p*
Age:						
≤ 35 years	99.0	1.0	0.0984	94.3	5.7	0.9840
> 35 years	97.6	2.4		94.3	5.7	
Family structure:						
Single	98.4	1.6	0.8017	92.1	7.9	0.1687
With support	98.0	2.0		94.4	5.6	
Qualification:						
Low (secondary)	97.1	2.9	0.1100	91.5	8.6	0.0114*
Medium-high (tertiary)	98.5	1.5		95.1	4.9	
Income:						
Low (≤ R20 000/month)[a]	98.2	1.8	0.1701	92.6	7.4	0.0086*
High (> R20 000/month)	99.1	0.9		96.2	3.8	

[a]At the time of the study, R20 000 was equal to approximately US $1 380.
*Statistically significant difference.

62.6% to 83% of participants,[4,42] but lower than a study conducted in Thailand (97%).[47] Our study results were comparable to another South African study, reporting that 81% of adolescents ate breakfast the previous day,[49] but lower than a study conducted among Grade 4 learners in Cape Town (> 90%).[23] More learners in our study consumed breakfast when compared with the results from the South African Health and Nutrition Examination Survey (SANHANES), where only 68% of children regularly consumed breakfast.[50] Our study, however, included caregivers from schools with a higher income, who were in a position to provide food more regularly and did not receive food through the National School Feeding Programme (NSFP). It should still be kept in mind that 46% of caregivers in our study had an income of ≤ R20 000 (± US $1 380) per month.

Even though 81.6% (*n* = 1 043) of respondents indicated that their child received breakfast five days a week, 88.0% (*n* = 1 124) indicated that they completely agree that 'it is important to eat breakfast'. It therefore seems that the intent of the caregiver did not always result in recommended practices.

Sirichakwal *et al*.[48] reported that children whose parents got up earlier and prepared breakfast were more likely to consume breakfast before school, indicating that time constraints in the morning influence breakfast intake. Children younger than 18 years whose parents eat breakfast with them in the morning were also more likely to eat breakfast themselves.[51] Only 389 (32.0%) of caregivers in our study ate breakfast with their children on most school mornings. These findings are lower when compared with a study done by ALBashtawy[52] in Jordan, where 52.1% of families ate breakfast together.

Significantly more caregivers older than 35 years provided children with breakfast daily (*n* = 700, 83.3%), and tended to eat together as a family more regularly (*n* = 270, 32.3%) than caregivers younger and equal to 35 years of age (*n* = 118, 29.7%).

Our research offers new insight in the breakfast eating habits of families living in central South Africa. Although older caregivers ate breakfast with their family more often and the breakfast quality of caregivers with a higher income and qualification was better, most caregivers did not eat breakfast together as a family and the nutritional quality score of breakfast foods provided was low, leading to the conclusion that intervention studies should be focused on not only children, but also families and ways that eating together as a family can be promoted.

Lunchbox

A healthy lunchbox should include a fruit or vegetable or both,[10] a dairy product (preferably reduced-fat),[25,26,53] water[29,53] and a fibre-rich, carbohydrate-rich food.[27,28] Recommendations from the 2015–2020 Dietary Guidelines for Americans state that a healthy eating pattern should also include protein foods (seafood, lean meats, poultry, eggs, legumes, nuts, seeds or soy products).[22] The inclusion of processed foods in the lunchbox, although convenient, should be limited.[28,30,31]

More than half of the caregivers (*n* = 658, 54.2%) intended to provide children with a healthy school lunchbox, and the median nutritional quality score for lunchbox foods was 35.6%. The quality of the lunchbox foods was associated positively with older caregivers (> 35 years), higher qualification and higher income. The attitudes of the caregivers with higher education and income were more positive towards a healthy lunchbox, although the attitudes from all sociodemographic groups were positive.

Most caregivers packed a lunchbox for school for their child (*n* = 1 224, 95.7%). This number is higher when compared with 37.6–69% in other South African studies,[23,50] keeping in mind that in our study no NSFP was implemented at the selected schools.

Similar to a study by Casado and Rundle-Thiele,[54] our study showed that caregivers rarely packed vegetables in their child's lunchbox on a daily basis (*n* = 54, 4.2%) and seldom at any other time of the week (*n* = 324, 25.2%), and also less often than fruit.[54] In comparison, 33.6% (*n* = 431) of caregivers in our study provided fruit, 21.4% (*n* = 275) a fruit bar and 35.8% (*n* = 460) dried fruit in the child's lunchbox five days a week, with 44.7% (*n* = 561) providing fruit on any day in the school week (keeping in mind that the fruit bar and dried fruit may contain added sugars). Hubbard *et al*.[53] evaluated children's lunchboxes in the USA where 3% (*n* = 19) and 30% (*n* = 185) of learners, respectively, brought vegetables and fruit to

school daily (keeping in mind that 52.8% of these children bought their lunch at school).

Our study is the first in central South Africa to evaluate the KAP of caregivers regarding lunchbox foods provided to their children. It is of interest to know that most caregivers had a positive attitude towards healthy lunchbox foods, but did not provide their children with healthy school lunchboxes in terms of the dietary quality scores obtained. Further research should focus on reasons why knowledge and intent of caregivers do not filter through into practices and how this obstacle can be overcome.

Conclusion

Areas of concern identified in this study were that learners were not eating together with caregivers as a family and that less than a quarter of the caregivers knew that five portions of fruits and/or vegetables are recommended per day. The results from this study show that caregivers generally had a positive attitude towards providing healthy breakfast and lunchbox foods, but that their intent did not always reflect in their practices. This might be ascribed to a lack of knowledge when considering the knowledge scores obtained.

Interventions may be more effective in some families, where caregivers have a more positive outlook on healthy eating and have a higher education, and therefore information may be better understood and applied.[55] Au *et al*.[56] recommended that online as well as personal programmes be used to improve nutritional knowledge, attitudes and behaviours. All caregivers can benefit from nutrition education to improve their nutrition knowledge and practices.

Limitations of the study

As schools and caregivers interested in nutrition will typically be more inclined to participate in a nutrition study, results could have been biased to an extent. Caregivers could have used resources at home to obtain correct answers to questions in the knowledge part of the questionnaire. As this would have improved their knowledge on the topic, the nutrition knowledge scores were regarded as valid.

The questionnaire used in the study was available only in English, which was not the primary language of most caregivers. It was therefore possible that caregivers could have misunderstood instructions or questions, although we aimed to ask easy and understandable questions.

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