South African Journal of Clinical Nutrition 2023; 36(1):20–32
https://doi.org/10.1080/16070658.2022.2048444

SAJCN
ISSN 1607-0658 EISSN 2221-1268

ARTICLE

Sociodemographic variables affecting caregivers' attitudes towards the provision of healthy breakfast and lunchboxes to children in their care

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Objective: A study was undertaken to determine the sociodemographic variables (SDV) and caregivers' attitudes that impact on healthy eating and the provision of healthy breakfast and school lunchboxes.
Design: This was a cross-sectional, descriptive study using self-administered questionnaires.
Setting: Participating Quintile 5 primary schools in Bloemfontein, South Africa (SA).
Participants: Caregivers of learners, aged 6–12 years ($N = 1\ 286$).
Main outcome measures: To determine associations between sociodemographic variables (SDV) and attitudes towards the provision of healthy breakfast and lunchbox foods.
Analysis: Wilcoxon two-sample test for unpaired data or the chi-square test to compare groups. A p-value of <0.05 indicated statistical significance.
Results: Caregivers with higher income and those living with a life partner were more likely to perceive healthy food as being more expensive than less healthy food ($p < 0.01$ and $p < 0.01$, respectively) and were of the opinion that preparing lunchboxes increased their workload ($p < 0.01$ and $p < 0.01$, respectively). Caregivers with lower income had a less positive attitude towards healthy eating habits ($p < 0.01$).
Conclusions: Caregivers mostly had a positive attitude towards providing healthy breakfast and lunchbox foods. Discrepancies between caregivers' perception of preparation time and cost of healthy food, and the provision of healthy food to learners, were observed.

Keywords: Caregiver attitudes, healthy eating, breakfast, lunchbox, feeding practices

Introduction

Caregivers are responsible for ensuring healthy food provision and optimal feeding practices of children. Children can only choose from the food provided to them. They also mimic their caregivers' food choices and would rather accept food provided when the health benefits of the food are explained by their caregivers.[1–3] Caregivers can promote healthy eating through their example, by eating healthily themselves.[4] It is therefore important to know what the attitudes of caregivers are towards healthy eating, as their attitude will likely affect their children's attitude towards healthy food.

Children must meet their nutritional requirements through the inclusion of healthy food in their diet for various reasons, amongst others cognitive and behavioural development.[5,6] Children with a better nutrient intake have been reported to experience fewer psychosocial problems and feelings of hunger.[7]

Unfortunately, parents (especially mothers) with a lower level of education have a lower 'health-attitude',[8] which may influence health messages to their children. Jarman *et al.*[9] reported that mothers who have a lower level of education tend to eat less healthy food and assign less significance to food and the importance thereof. Additionally, children from a family with a lower socioeconomic background (SEB) tend to consume less fruit and vegetables and more fats.[3,10] Sanigorski *et al.*[10] reported from an Australian study that children (5–12 years) from a low SEB were provided with more 'convenient' types of food (energy-dense and low in nutrients) in their lunchboxes compared with children from a higher SEB. Caregivers from a lower SEB also perceived healthy foods as more expensive than 'unhealthy' foods.[8,11]

It is essential to promote healthy eating and good feeding practices. Therefore, it is important to understand the factors that influence caregivers' food choices, which include who the provider is in the household, the educational level of the caregiver, sociodemographic variables (SDV) of the family, funds available to spend on a lunchbox and the time it takes to pack a lunchbox.[10]

Understanding the influence that caregivers' SDV, knowledge and attitudes may have on the healthy eating habits of children can assist with the planning of intervention programmes to train caregivers on healthy, affordable food, and why they should provide healthy food to children in their care.[12] As a result, this study investigated SDV and caregivers' attitudes that impact on healthy eating and the provision of healthy breakfast and school lunchboxes.

Methods

Study design

This descriptive study followed a quantitative, cross-sectional study design.

Study sample

For this study to be comparable to published studies from developed countries, only Quintile 5, public and independent schools in Bloemfontein were included in the study. Schools from Quintiles 1–4 were not included as they may have many learners who make use of the school nutrition programme[13] because of the expected lower socioeconomic status, which might have influenced the results of this study. Time, accessibility and budget constraints limited the study to schools in Bloemfontein in the Motheo District, Free State province.

Primary caregivers of foundation phase learners (Grade 1–3) who were attending a Quintile 5 public or independent school, in Bloemfontein (Motheo District) in the Free State province and were willing to complete the questionnaire in English were included in the study. Quintile 5 schools can include parents and/or caregivers speaking any of the 11 official languages in South Africa but, due to financial constraints, questionnaires were made available only in English. Primary caregivers were excluded from the study, however, if their children attended schools that did not provide consent to participate in the study and they did not wish to participate in the study.

Collective administration was used to distribute and retrieve the self-completed questionnaires from the primary caregivers. According to the children's act of South Africa,[14] 'a caregiver is someone other than the parent who is taking care of a child'. For the purpose of this study the primary caregiver refers to either the parent or caregiver of the child.

Printed questionnaires were used, as these are easily accessible and may improve the expected low response rate (20–50%).[15] All the Quintile 5 schools (40 schools) in Bloemfontein were approached by the researcher. Fifteen schools, of which nine were public schools and six independent schools, granted permission to conduct the study at their school. Of the 3 198 learners attending the foundation phase (Grade 1–3; ± 6–12 years old) classes of these schools (2 674 from the public and 524 from the independent schools), 1 286 primary caregivers (40%) provided consent to participate in the study by completing the questionnaires. The primary caregivers completed a questionnaire for their oldest child in Grade 1–3.

Questionnaire

Consenting caregivers of foundation phase (Grade 1–3) learners (age 6–12 years) attending the participating schools completed a printed copy of the questionnaire. The questionnaire items focused on nutritional knowledge, attitudes towards food and practices of the learners and/or caregivers. A literature search identified relevant questions from other studies, focusing on nutritional knowledge (Table 1) and/or attitudes (Table 2) and/or practices (Table 3) of learners and/or caregivers. Four health professionals and a biostatistician evaluated the content to ensure the validity of the questionnaire.[16–34] A pilot study was conducted to test understanding of the questions and ensure the reliability of the questionnaire. Because no significant changes were made to the questionnaire, the results obtained from the pilot study were included in the final analysis.

The questionnaire assessed the attitudes of caregivers towards a healthy breakfast and lunchbox by means of 15 questions, rated on a scale that included the following options: completely agree, agree, sometimes agree, sometimes disagree, disagree, and completely disagree.[15,35] To calculate the attitudinal scores, a score of 5 was allocated for the highest intensity desired response and a score of 0 for the highest intensity least desired response. An attitude score below 50% was regarded as an unfavourable attitude and 50% or above as a positive attitude towards healthy breakfast and lunchbox foods and practices.

For this study, we did not measure the portion sizes of food items selected for breakfast and lunchboxes. We defined breakfast as the first meal that the learner consumes within two hours of waking and before arriving at school, while the meal must contribute to the learner's daily energy, macro- and micronutrient intake.[24] Lunchbox food was defined as food and beverages brought from home and consumed during the day at school.[13]

Table 1: Questions included in the questionnaire to assess the nutritional knowledge of primary caregivers

Question/statement[reference(s)]
What type of milk and milk products are the healthiest for your child?[16]
Skipping breakfast is good for your child's concentration at school.[13,17]
Eating breakfast will make you gain weight.[17,18]
It is important that breakfast foods contain fibre.[17]
It is important to eat fruit with breakfast.[19]
Breakfast is important for growth and development.[20]
Is it important for your child to eat the food in his/her lunchbox?[21]
Why is it important to pack a school lunchbox? (authors)
Does eating fruits and vegetables daily assist in reducing the risks of developing certain diseases?[13,21]
How many helpings of fruit and vegetables should your child eat every day?[21]
Are foods that contain fibre (roughage) important in your child's diet?[21]
Which food do you regard as the healthiest?[13]
Can fats help with the absorption of certain nutrients?[13]
When you eat lots of fat and fatty foods, you can: (Select **all** the appropriate answers)[21] ■ Become fat (overweight) ■ Concentrate better ■ Feel more energetic ■ Get high blood pressure ■ Get a heart attack ■ Get diabetes
Do chips contain healthy fats?[13]
Do nuts contain healthy fats?[13]
Do avocado pears contain healthy fats?[13]
Eating a lot of sugar, candy, and sweet foods: (Select **all** the appropriate answers)[21] ■ 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):[21] ■ Meat, fish & chicken ■ Dairy ■ Fruits ■ Vegetables ■ Unrefined starchy foods/carbohydrates ■ Beans and lentils ■ Fats
Do biscuits/cookies contain healthy fats?[13]

Table 2: Questions included in the questionnaire to assess caregivers' attitudes towards breakfast and lunchboxes

Question/statement[reference(s)]
It is important to eat breakfast.[2,8]
You do not give your child breakfast because there is not enough time.[8,22]
You do not give your child breakfast because it is too expensive.[8,22]
You do not give breakfast to your child because he/she does not want to eat.[8,22]
You give your child breakfast because it is important for their health.[18,22,23]
You give your child breakfast because it is important for concentration.[18,22,23]
You give your child breakfast because you grew up eating breakfast.[18,22,23]
You give your child breakfast because your child asks you to have breakfast.[18,22,23]
Healthy food packed into a lunchbox would help reduce the risk of your child developing certain diseases.[8]
A healthy lunchbox does not help my child to concentrate at school.[8]
To prepare a healthy lunchbox is an extra workload.[8]
I seldom read the food label before I buy a new food item.[8]
Healthy food is more expensive than less healthy food.[8]
In general, healthy food is tasty.[8]
It is important to have healthy eating habits.[8]

We recorded the breakfast and lunchbox foods provided to the learner, as reported by the caregiver in the questionnaire, using a food frequency table. The food items listed in the food frequency table included foods regarded as healthy breakfast[18,24,29] and lunchbox[2,36] foods. We also listed alternative, less healthy, local breakfast and lunchbox food choices that are commonly included for breakfast and lunchboxes. On the food frequency table, respondents had to indicate the breakfast and lunchbox food options for the five days of the school week. The food frequency table in the questionnaire contained 12 questions that evaluated the breakfast and lunchbox nutrition practices of the caregiver.

The food for breakfast was categorised as dairy, fruit and vegetables, porridge and cereal, bread and muffins, and protein-rich foods. The highest score that could be attained for breakfast foods was 30 and the lowest −15. For lunchbox foods, food categories included bread, protein-rich foods, biscuits, muffins, bars (fruit, snack or commercial), fresh fruit and vegetables, takeaway/fast foods and treats. The highest score that could be attained for lunchbox foods was 45 and the lowest −35.

A positive score was allocated for every day that a healthy choice was provided from each category for breakfast and lunchbox foods. A negative score was allocated for every day that an unhealthy option, in each category, was provided for breakfast and lunchboxes, based on a similar study by Vereecken and Maes.[8] The scores could only range between −5 and 5 per category, limited by the five school days in a week. Missing answers and incomplete questions scored zero.

Ethical considerations

Approval to conduct the study in the identified schools was obtained from the provincial Department of Basic Education (DBE). The Health Sciences Research Ethics Committee of the University of the Free State granted ethical approval for the study (reference number: UFS-HSD2017/1093). Caregivers were invited to participate anonymously and implied consent by completing the questionnaire.

Data analysis

Data were captured in duplicate in a Microsoft Excel spreadsheet (Microsoft Corp, Redmond, WA, USA) and verified, after which the data were analysed by the Department of Biostatistics, University of the Free State, using Statistical Analysis System (SAS, version 9.4; SAS Institute, Cary, NC, USA).[37]

The sociodemographic information of the caregivers was grouped to examine possible links between different variables observed in this study. Caregivers' education was grouped into low (secondary level education) and medium/high (tertiary level education). The caregivers' income was grouped as low (≤ R20 000 [± US $1 380], per month) and high (> R20 000 [± US $1 380] per month), taking the South African rand (ZAR) to US dollar exchange rate at the time of the study into account. Family structure was categorised as living with life partners (married and living together) and others (single, divorced/separated, and widowed). The age of the caregivers was divided into ≤ 35 years and > 35 years of age, similar to a study by Vereecken and Maes.[8]

To determine associations of sociodemographic variables (SDV) and attitudes towards the provision of healthy breakfast and lunchbox foods, the six choices of agreement were categorised into 'agree' (completely agree and agree), 'sometimes agree', 'sometimes disagree', 'disagree' (completely disagree and disagree).

Categorical data were summarised by frequencies and percentages and continuous variables were summarised by medians, minimum and maximum values, or percentiles for asymmetric data. The means and standard deviation (SD) were used if the variable had a symmetric distribution. Groups were compared using the Wilcoxon two-sample test for unpaired data or the chi-square test. A p-value of < 0.05 was used to indicate statistical significance.

Results

Study population

Of the 40 schools approached to participate, 15 (37.5%) agreed to take part in the study. In total, 1 286 (40.2%) of the 3199 caregivers invited to participate in the study completed and returned the questionnaire.

Slightly more learners were male ($n = 653$, 51.9%), with the mean age of the learners 7.7 years (SD ± 1.00) and the caregivers 38.6 years (SD ± 6.99). The questionnaire was mostly completed by the mother of the learner ($n = 1\,077$, 84.8%), followed by the father of the learner ($n = 125$, 9.8%). Of the caregivers participating in the study, 1 001 (79.8%) were living with a life partner (married or living together), and 253 (20.2%) were single, divorced or separated (other). The majority of caregivers had a tertiary qualification ($n = 863$, 69.1%), were employed > 35 hours per week ($n = 761$, 61.0%) and had an income above R20 000 (± US$1 380) per month ($n = 584$, 53.9%).

Breakfast

The attitudes of the caregivers were mostly positive towards healthy breakfast foods and practices, with a median attitude score of 82.5% (range 75–90%) for breakfast.

Attitudes

The general attitudes of caregivers regarding breakfast are displayed in Figure 1. The majority of the caregivers ($n = 1\,124$,

Table 3: Questions included in the questionnaire to assess the nutritional practices of primary caregivers

Question/statement[reference(s)]
If your child eats breakfast, when does your child eat breakfast?[24] ■ When you wake your child up ■ Within 2 hours after waking up ■ On the way to school ■ At school ■ My child does not eat breakfast
How many days in a school week does your child eat breakfast?[25]
Do you mostly eat breakfast together as a family?[26]
What type of milk and milk products do you mostly use at home?[27,28]
Should you avoid giving your child something to drink with breakfast?[2]
If your child drinks something with breakfast, please specify what he or she drinks.[2,8,29]
What type of breakfast foods do you give your child? Please indicate how many times a week.[18,24,29,30] ■ Dairy products ■ Fruit ■ Vegetables ■ Porridge/cereal ■ Bread or muffin ■ Protein-rich food
Choose one single criterion that you consider as most important for a school lunchbox.[8,13] ■ Quick to prepare ■ Affordable ■ Healthy ■ Filling/datisfying ■ A treat ■ To improve school performance ■ To restrict tuck-shop visits ■ To save money ■ It is expected of me ■ Other (please specify)
How many days in a school week do you pack a lunchbox for break time?[8,31]
How long does it take you to prepare lunchboxes?[8] ■ Less than 15minutes ■ 16–30 minutes ■ 31–45 minutes ■ More than 45 minutes
What do you pack in your child's school lunchbox and indicate how many times a week, on average (0–5).[29,32,33] Please mark the appropriate block with an X. ■ Bread ■ Protein-rich food ■ Biscuits ■ Muffin ■ Bars ■ Takeaway/fast food (please specify) ■ Treats
What types of beverages do you include in your child's lunchbox in a typical school week? Please indicate how many times a week (0–5 days).[2,8] Please mark the appropriate block with an X. ■ Fruit juice ■ Tea or coffee ■ Cool drink concentrate ■ Fizzy drink (Diet, Zero, Light) ■ Fizzy drink (regular sugar-sweetened) ■ Energy drink (Red Bull, Play, Monster, etc.) ■ Dairy (Yogisip, Steri Stumpi, SuperM, Maas, Latté, yoghurt, etc.) ■ Water ■ Other, please specify
Are you concerned about including certain foods because it can go bad in the lunchbox during the day?[34]
How many days per week does your child get money to buy food at the school/tuck shop?[34]

88.0%) completely agreed with the statement, 'it is important to eat breakfast', while five (0.4%) caregivers did not fully agree (Figure 1). Mostly caregivers ($n = 1\ 004$, 80.3%) did not feel that breakfast is too expensive to provide (Figure 1). Generally, caregivers provided breakfast to their children, because 'it is important for their health', with 88.4% ($n = 1\ 061$) indicating that they agreed with this statement (Figure 1).

Table 4 summarises the associations between SDVs and the attitudes of the caregivers towards breakfast. No SDVs affected the caregivers' attitude towards the importance of breakfast, the cost of breakfast foods, or the importance of eating breakfast for health and concentration. Caregivers with a higher income, > 35 years of age and with a tertiary qualification disagreed significantly with those who had a lower income ($p < 0.01$), were ≤ 35 years of age ($p = 0.03$) and had a secondary school qualification ($p < 0.01$), regarding the effect of time constraints when providing their children with breakfast.

Practices

Approximately one-third ($n = 389$, 32.2%) of caregivers indicated that they ate breakfast together as a family. Families with a lower income ate breakfast together significantly more often ($n = 172$, 34.5%) than those with a higher income ($n = 164$, 28.4%) ($p = 0.03$).

Most learners ($n = 1\ 043$, 81.7%) ate breakfast every school day, and 1 176 (91.4%) ate breakfast within two hours after waking up between 1 and 5 days in a school week. Caregivers with a higher income ($n = 492$, 45.7%) and qualification ($n = 720$, 58.0%) provided breakfast on a daily basis more often ($p < 0.01$ for both). Nonetheless, although not statistically significant, younger caregivers and those with a lower qualification ate breakfast together more often ($p = 0.36$ and $p = 0.46$, respectively).

The preferred breakfast food was ready-to-eat breakfast cereals (RTEBC) including Weet-Bix ($n = 660$, 51.3%), cornflakes ($n = 575$, 44.7%), puffed cereal ($n = 466$, 36.2%) and bran flakes ($n = 302$, 23.5%). Table 5 lists the food group items consumed by the learners for breakfast and the median intake within each food group.

The preferred beverages served for breakfast were tea ($n = 380$, 29.6%), water ($n = 307$, 23.9%), fruit juice ($n = 292$, 22.7%) and milk ($n = 195$, 15.2%,). Most families used full-cream milk ($n = 1\ 111$, 86.4%), with 206 (16.0%) using reduced fat and 43 (3.0%) using fat-free milk. The majority of caregivers ($n = 1\ 029$, 80.2%) believed that full-cream milk was the healthiest option for their child.

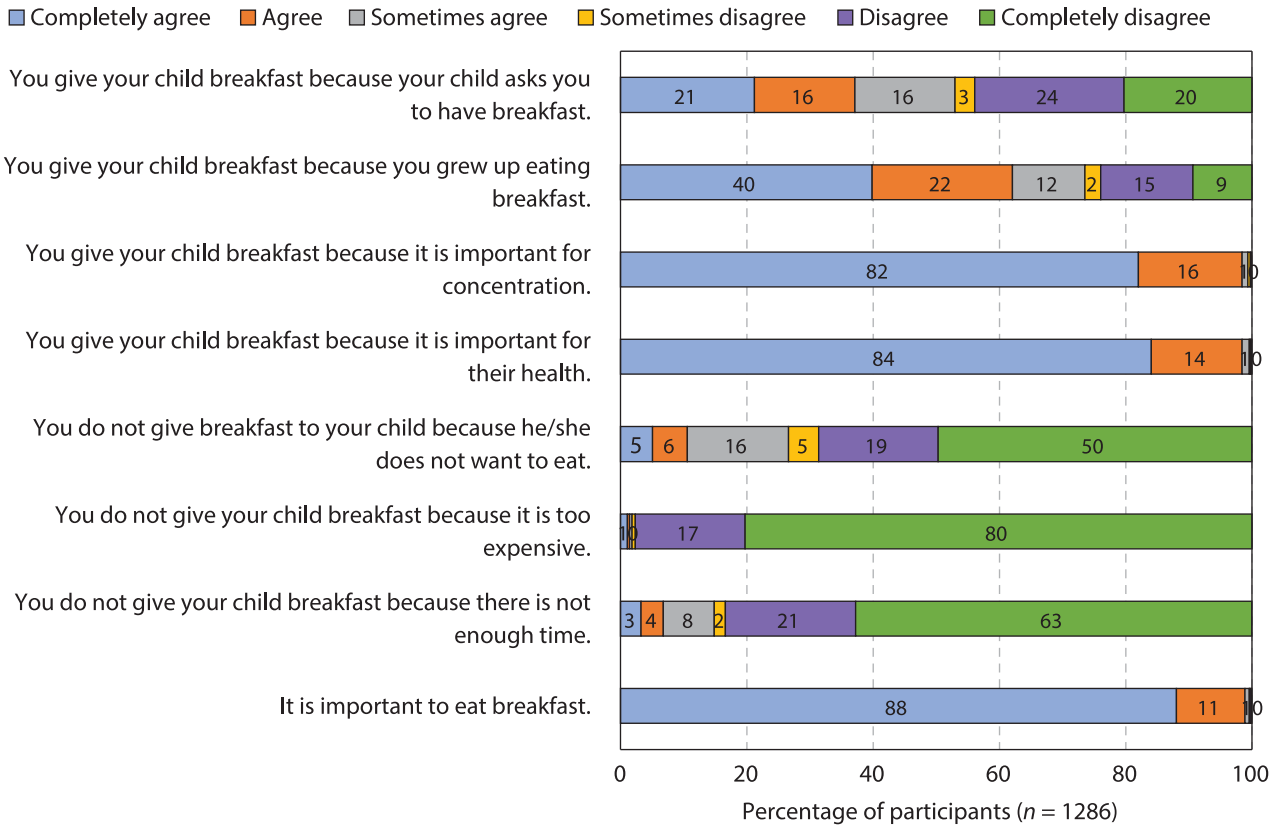

Figure 1: Caregivers' attitudes towards healthy breakfast food.

Lunchbox foods

The attitudes of the caregivers were mostly positive towards healthy lunchbox foods and practices, with a median attitude score of 71.4% (range 62.9–80.0%).

Attitudes

Caregivers generally agreed that it was important to have healthy eating habits, with 1 095 (87.7%) indicating that they completely agree with this statement (Figure 2). Most caregivers ($n = 1\,213$, 97.7%) agreed that healthy food packed into a lunchbox would help reduce the risk of their child developing certain diseases. Most caregivers agreed (to an extent) that healthy food was tasty ($n = 1\,062$, 85.6%), while 179 (14.4%) did not think healthy food was tasty.

The attitudes of caregivers with higher incomes were more positive towards healthy eating habits ($p < 0.01$) than those of any of the other SDVs. Although most caregivers perceived packing a lunchbox as an additional workload, those with a higher income, living with a life partner and older caregivers perceived it as being more of an extra workload, at a statistically significant level ($p < 0.01$ for all), than caregivers with lower income, living without a partner and those ≤ 35 years.

Caregivers with a higher income, a life partner and a tertiary education more often read the food labels before buying new foods (Table 6). Caregivers with a higher income and those living with a life partner perceived healthy food as more expensive than less healthy food, at a statistically significant level ($p < 0.01$ for both). There was a significant difference between younger and older caregivers perceiving that healthy food was tasty. Younger caregivers indicated that healthy food was tasty to a greater extent than older caregivers ($p = 0.02$). There was no difference between SDVs and the attitudes of the caregivers regarding whether a healthy lunchbox helped their child to concentrate at school.

Practices

In total, 1 124 (95.2%) caregivers provided a lunchbox to take to school daily. It took most caregivers less than 15 minutes ($n = 764$, 61.1%) or 16–30 minutes ($n = 417$, 33.3%) to pack lunchboxes. There was no significant difference between the income of the caregiver and whether they provided a lunchbox to school ($p = 0.08$). However, children of caregivers with lower incomes received tuck-shop money and fast foods significantly more often ($p < 0.01$ and $p < 0.01$, respectively) and received water significantly less often ($p < 0.01$) than children of caregivers with higher incomes.

Most caregivers ($n = 1\,034$, 80.4%) indicated that it was essential to pack a lunchbox for school to ensure that their child would not go hungry, while only 63 caregivers (4.9%) considered lunchboxes as not essential. A total of 902 (70.1%) caregivers indicated that a lunchbox ensured better concentration, 838 (65.2%) provided a lunchbox to make sure that their child ate healthy food and 206 (16.0%) caregivers provided lunchboxes to save money.

Caregivers with a higher qualification provided fruit ($p < 0.01$) and vegetables ($p < 0.01$) in their child's lunchbox more often than those with a secondary qualification. Dairy products were included in the lunchbox by 547 (42.6%) caregivers, and water by 1 000 (77.9%) caregivers, on one to five school days.

Table 7 indicates the median intakes of the different food groups measured in this study. The median intake of fruit (median 3) was higher than for vegetables (median 0).

Table 4: Sociodemographic variables influencing the breakfast attitudes of the caregivers

		Income ($N = 1\ 025$)		Marital status ($N = 1\ 182$)		Age ($N = 1\ 169$)		Qualification ($N = 1\ 177$)	
Statement	**Response**	**≤ R20 000 (±US $1 380)* ($n = 469$) *n* (%)**	**> R20 000 (±US $1 380) ($n = 556$) *n* (%)**	**With life partner ($n = 941$) *n* (%)**	**Other (n = 241) *n* (%)**	**≤ 35 years ($n = 370$) *n* (%)**	**> 35 years ($n = 799$) *n* (%)**	**Secondary ($n = 357$) *n* (%)**	**Tertiary ($n = 820$) *n* (%)**
It is important to eat breakfast	A	463 (98.7)	553 (99.5)	935 (99.4)	237 (98.3)	365 (98.7)	793 (99.3)	353 (98.9)	814 (99.3)
	S-A	4 (0.9)	2 (0.4)	4 (0.4)	2 (0.8)	4 (1.1)	2 (0.3)	2 (0.6)	4 (0.5)
	S-D	0 (0)	1 (0.2)	1 (0.1)	0 (0)	0 (0)	1 (0.1)	0 (0)	1 (0,1)
	D	2 (0.4)	0 (0)	1 (0.1)	2 (0.8)	1 (0.3)	3 (0,4)	2 (0.6)	1 (0,1)
	p	0.20		0.11		0.25		0.56	
You do not give your child breakfast because there is not enough time	A	29 (6.3)	26 (4.7)	48 (5.2)	13 (5.5)	15 (4.1)	47 (6.0)	14 (4.0)	46 (5.7)
	S-A	48 (10.5)	35 (6.3)	69 (7.4)	23 (9.7)	36 (9.8)	51 (6.5)	41 (11.8)	51 (6.3)
	S-D	11 (2.4)	5 (0.9)	15 (1.6)	4 (1.7)	9 (2.5)	8 (1.0)	11 (3.2)	8 (1.0)
	D	371 (80.8)	487 (88.1)	796 (85.8)	197 (83.1)	306 (83.6)	678 (86.5)	281 (81.0)	708 (87.1)
	p	0.001†		0.70		0.03†		<0.001†	
You do not give your child breakfast because it is too expensive	A	10 (2.2)	7 (1.3)	15 (1.6)	2 (0.9)	3 (0.8)	14 (1.8)	5 (1.5)	12 (1.5)
	S-A	2 (0.4)	1 (0.2)	3 (0.3)	1 (0.4)	4 (1.1)	1 (0.1)	1 (0.3)	2 (0.3)
	S-D	3 (0.7)	2 (0.4)	5 (0.5)	0 (0)	1 (0.3)	4 (0.5)	3 (0.9)	2 (0.3)
	D	442 (96.7)	540 (98.2)	900 (97.5)	233 (98.7)	356 (97.8)	761 (97.6)	335 (97.4)	794 (98)
	p	0.53		0.67		0.07		0.48	
You give your child breakfast because it is important for their health	A	457 (98.5)	548 (99.1)	922 (98.7)	237 (99.6)	364 (98.6)	781 (99.1)	349 (99.2)	805 (98.8)
	S-A	4 (0.9)	5 (0.9)	9 (1.0)	0 (0)	4 (1.1)	5 (0.6)	2 (0.6)	7 (0.9)
	S-D	1 (0.2)	0 (0)	1 (0.1)	1 (0.4)	0 (0)	1 (0.1)	0 (0)	2 (0.3)
	D	2 (0.4)	0 (0)	2 (0.2)	0 (0)	1 (0.3)	1 (0.1)	1 (0.3)	1 (0.1)
	p	0.34		0.22		0.62		0.76	
You give your child breakfast because it is important for concentration	A	455 (98.3)	548 (99.1)	925 (99.0)	232 (98.3)	364 (98.9)	778 (98.9)	346 (98.9)	806 (98.9)
	S-A	5 (1.1)	4 (0.7)	7 (0.8)	2 (0.9)	2 (0.5)	7 (0.9)	2 (0.6)	7 (0.9)
	S-D	1 (0.2)	1 (0.2)	1 (0.1)	1 (0.4)	1 (0.3)	1 (0.1)	0 (0)	2 (0.3)
	D	2 (0.4)	0 (0)	1 (0.1)	1 (0.4)	1 (0.3)	1 (0.1)	2 (0.6)	0 (0)
	p	0.50		0.31		0.63		0.20	

Abbreviations: A: agree; S-A: sometimes agree; S-D: sometimes disagree; D: disagree

*Calculated according to the rand–dollar (R20 000 was equal to approximately US $1 380) exchange rate at the time of the study.

†$p < 0.05$ indicates a statistically significant difference.

Table 5: Reported breakfast intake per food group

Food group	Median	Range
Porridge and RTEBC*	−1	−5 to 1
Bread	0	−3 to 2
Dairy	5	0 to 5
Fruit	2	0 to 4
Vegetables	0	0 to 3
Protein-rich foods	2	0 to 5

RTECB: ready-to-eat breakfast cereal.

Four hundred and thirty-one (33.5%) caregivers provided fruit five days a week, and only 4.2% included a vegetable in the lunchbox five days a week. Caregivers with a tertiary qualification provided fruit more often ($p < 0.01$) five days a week and vegetables ($p < 0.01$) 1–4 days a week more often than those with a secondary qualification. Most caregivers did not include a fibre-rich bread (median 0) in the lunchbox. Seven hundred and twenty-six (56.5%) caregivers packed white bread, white bread with added fibre ($n = 339$, 26.4%) and brown or whole wheat bread ($n = 479$, 37.2%), while only 160 (12.4%) provided brown low glycaemic index (GI) bread, 1–5 days of the school week. Protein foods included in the lunchbox were mostly cheese ($n = 797$, 62%), processed meat ($n = 737$, 57.3%), red meat ($n = 553$, 43.0%) and chicken ($n = 427$, 33.2%).

The treats typically provided in the lunchbox included potato crisps, candy, dried fruit, nuts, cake and popcorn (Table 8). Caregivers were generally aware that popcorn is regarded as a healthier snack than potato crisps ($n = 1\,152$, 96.3%).

Some 11% of learners received money for the tuck shop 2–5 days a week, while 33.6% of learners did not receive tuck-shop money and 54.8% received tuck shop money only once a week. There was no significant difference between the breakfast ($p = 0.12$) and lunchbox ($p = 0.35$) practices of caregivers with life partners and those without life partners.

Discussion

Research has shown that, even though there is a small discrepancy between the dietary intake of children (aged 3–4 years) and mothers' nutritional knowledge and attitudes, mothers with higher nutritional knowledge and a positive attitude towards healthy eating provide their children with healthier food.[8]

Generally, in this study, the attitudes of the caregivers were positive towards healthy breakfast (median 82.5%) and lunchbox (median 71.4%) foods and practices. These results were similar to the findings of Vereecken and Maes[8] on the dietary habits, knowledge and attitudes of mothers with children aged 3–4 years.

For caregivers older than 35 years, with a higher income and a tertiary qualification, time constraints in the morning were less of an obstacle to providing breakfast. Caregivers with a tertiary qualification also provided breakfast more often than those with a secondary qualification. Contrary to findings reported by Vereecken and Maes,[8] caregivers in our study with a lower income, age and qualification were more prone to reading the food label before purchasing a new type of food.

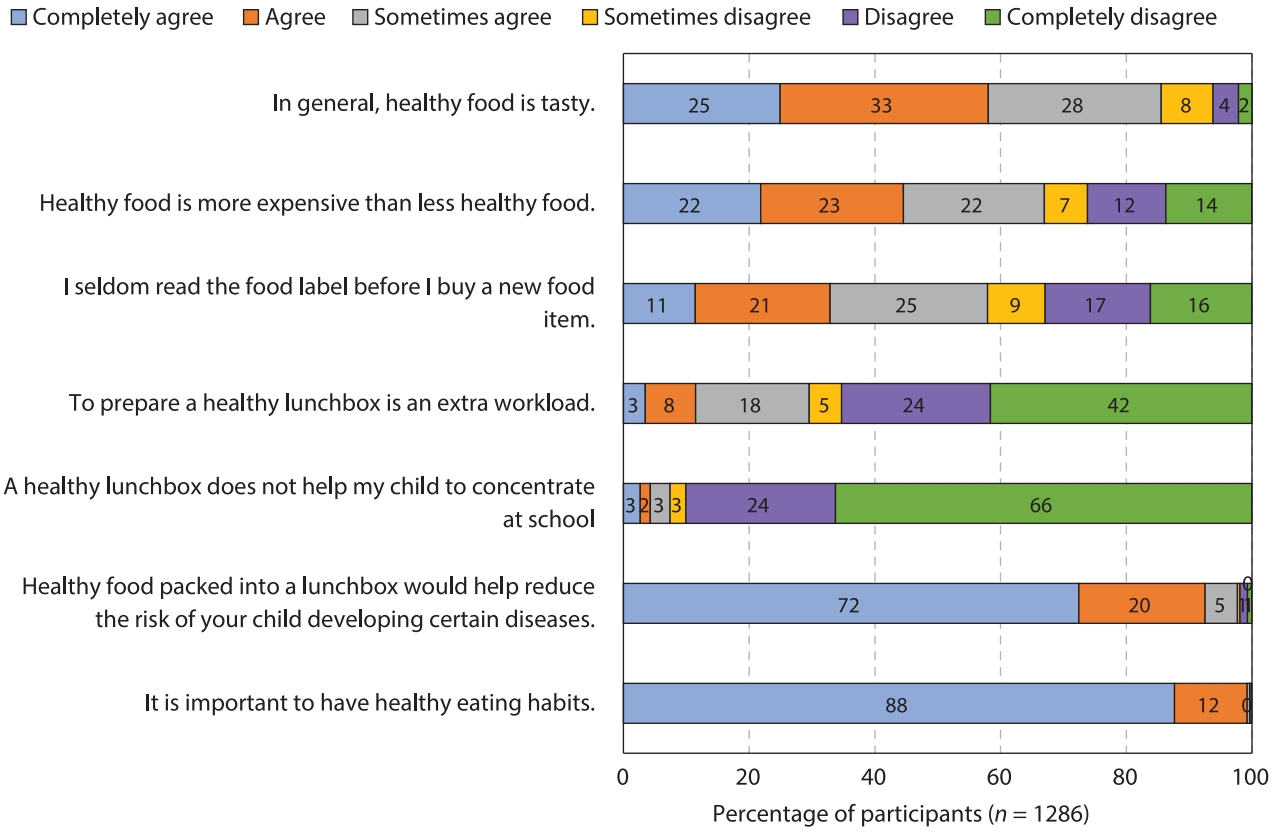

Figure 2: Caregivers' attitudes towards healthy lunchbox food.

Table 6: Sociodemographic variables influencing lunchbox attitudes of caregivers

Statement	Response	Income ($N = 1\ 025$)		Marital status ($N = 1\ 182$)		Age ($N = 1\ 169$)		Qualification ($N = 1\ 177$)	
		≤ R20 000 (±US $1 380)* ($n = 469$) *n* (%)	> R20 000 (±US $1 380) ($n = 556$) *n* (%)	With life partner ($n = 941$) *n* (%)	Other ($n = 241$) *n* (%)	≤ 35 years ($n = 370$) *n* (%)	> 35 years ($n = 799$) *n* (%)	Secondary ($n = 357$) *n* (%)	Tertiary ($n = 820$) *n* (%)
It is important to have healthy eating habits	A	455 (98.7)	549 (100)	926 (99.6)	231 (98.7)	363 (99.2)	786 (99.5)	348 (99.2)	803 (99.4)
	S-A	3 (0.7)	0 (0)	1 (0.1)	2 (0.9)	2 (0.6)	1 (0.1)	1 (0.3)	3 (0.4)
	S-D	0 (0)	0 (0)	1 (0.1)	0 (0)	0 (0)	1 (0.1)	1 (0.3)	0 (0)
	D	3 (0.7)	0 (0)	2 (0.2)	1 (0.4)	1 (0.3)	2 (0.3)	1 (0.3)	2 (0.3)
	p	0.009†		0.15		0.60		0.50	
A healthy lunchbox does not help my child to concentrate at school	A	24 (5.3)	20 (3.6)	45 (4.9)	5 (2.2)	14 (3.9)	35 (4.5)	17 (5.0)	32 (4.0)
	S-A	17 (3.7)	11 (2.0)	24 (2.6)	11 (4.8)	11 (3.0)	22 (2.8)	15 (4.4)	20 (2.5)
	S-D	8 (1.8)	15 (2.7)	25 (2.7)	5 (2.2)	8 (2.2)	21 (2.7)	9 (2.6)	21 (2.6)
	D	406 (89.2)	505 (91.7)	832 (89.9)	210 (90.9)	333 (91.0)	704 (90.0)	302 (88.1)	736 (91.0)
	p	0.14		0.10		0.91		0.30	
To prepare a healthy lunchbox is an extra workload	A	38 (8.3)	78 (14.3)	119 (12.9)	16 (6.8)	26 (7.1)	108 (13.9)	36 (10.5)	98 (12.2)
	S-A	75 (16.5)	110 (20.1)	176 (19.1)	31 (13.2)	69 (18.9)	134 (17.2)	48 (14.0)	158 (19.6)
	S-D	22 (4.8)	32 (5.9)	42 (4.6)	15 (6.4)	24 (6.6)	34 (4.4)	16 (4.7)	40 (5.0)
	D	321 (70.4)	327 (59.8)	583 (63.4)	173 (73.6)	246 (67.4)	503 (64.6)	24 (70.9)	510 (63.3)
	p	<0.01†		<0.01†		<0.01†		0.07	
I seldom read the food label before I buy a new food item	A	169 (37.0)	148 (26.8)	290 (31.4)	84 (35.9)	133 (36.5)	238 (30.3)	142(40.9)	233 (28.9)
	S-A	121 (26.5)	146 (26.5)	245 (26.5)	51 (21.8)	104 (28.6)	186 (23.7)	78 (22.5)	215 (26.7)
	S-D	41 (9.0)	48 (8.7)	81 (8.8)	25 (10.7)	36 (9.9)	69 (8.8)	28 (8.1)	75 (9.3)
	D	126 (27.6)	210 (38.0)	308 (33.3)	74 (31.6)	91 (25.0)	292 (37.2)	99 (28.5)	283 (35.1)
	p	<0.01†		0.29		<0.01†		<0.01†	
Healthy food is more expensive than less healthy food	A	214 (47.0)	227 (41.3)	406 (43.9)	105 (45.3)	160 (43.8)	350 (44.7)	165 (48.0)	344 (42.6)
	S-A	80 (17.5)	160 (29.1)	228 (24.7)	39 (16.8)	93 (25.5)	170 (21.7)	64 (18.6)	201 (24.9)
	S-D	32 (7.0)	36 (6.6)	65 (7.0)	10 (4.3)	22 (6.0)	51 (6.5)	24 (7.0)	52 (6.4)
	D	130 (28.5)	127 (23.1)	226 (24.4)	78 (33.6)	90 (24.7)	212 (27.1)	91 (26.5)	211 (26.1)
	p	0.01†		0.01†		0.53		0.12	
In general, healthy food is tasty	A	262 (57.6)	333 (60.6)	550 (59.4)	131 (57.0)	195 (53.4)	478 (61.1)	213 (61.9)	467 (57.9)
	S-A	124 (27.3)	149 (27.1)	255 (27.5)	63 (27.4)	123 (33.7)	197 (25.2)	90 (26.2)	225 (27.9)
	S-D	38 (8.4)	40 (7.3)	70 (7.6)	20 (8.7)	29 (8.0)	61 (7.8)	21 (6.1)	70 (8.7)
	D	31 (6.8)	28 (5.1)	51 (5.5)	16 (7.0)	18 (5.0)	46 (6.0)	20 (5.8)	45 (5.6)
	p	0.57		0.76		0.02†		0.40	

Abbreviations: A: agree; S-A: sometimes agree; S-D: sometimes disagree; D: disagree
*Calculated according to the rand–dollar exchange rate at the time of the study.
†$p < 0.05$ indicates a statistically significant difference.

Table 7: Reported lunchbox intake per food group

Food group	Median	Range
Fruit	3	1 to 5
Vegetables	0	0 to 1
Bread	0	−5 to 5
Biscuits	−1	−3 to 5
Muffins	5	0 to 5
Bars	5	2 to 5
Treats	0	−3 to 3
Protein-rich foods	1	−1 to 3

Caregivers with a higher income were more positive towards healthy eating habits. Nonetheless, caregivers with a higher income and those living with a life partner believed that healthy food was expensive and packing a healthy lunchbox for school entailed additional workload.

Most caregivers completely agreed that it was important to eat breakfast, breakfast foods were not expensive, and that eating breakfast was important for health. Furthermore, they completely agreed that it was important to have healthy eating habits and that a healthy lunchbox reduced the risk of developing certain diseases. Generally, caregivers perceived healthy food to be tasty to some extent, with younger caregivers being more positive about the taste of healthy food.

When considering the data reported, caregivers wanted to provide their children with healthy food, but did not necessarily know what type of food to provide for breakfast and in their lunchboxes.

Breakfast foods

Benefits of breakfast consumption include improved cognition[7,18,38] and better psychosocial functioning.[38] We found that 81.7% of learners ate breakfast daily before going to school, which was comparable with other studies conducted in SA[13,39,40] and in other countries.[41–43] Learners who had breakfast (1–5 days a week) ate within two hours of waking up, which was consistent with the recommendation by Rampersaud *et al.*[17] that children who do not eat breakfast at home (due to time constraints) should eat breakfast on their way to school or at school.

Breakfast should provide approximately one-third of the child's daily requirements, and a balanced breakfast consists of a fibre-rich carbohydrate, reduced-fat milk or milk product, fruit and a lean protein.[2,17,18,24] When focusing on a fibre-rich carbohydrate option for breakfast, it seemed that caregivers provided RTEBC, advertised for children as a good option as a carbohydrate source for breakfast, to save time. However, it is higher in carbohydrates, sugar and salt when compared to RTEBC not advertised specifically for children[44] and therefore often not a better option for breakfast.

Table 8: Treats provided in lunchboxes ($N = 1\ 286$)

Treats	0 days *n* (%)	1–5 days *n* (%)
Cake (Tinkies, cupcake, cake)	876 (68.1)	410 (31.9)
Candy (sugar or jelly candy, chocolate)	806 (62.7)	480 (37.3)
Dried fruit	826 (64.2)	460 (35.8)
Nuts	874 (68.0)	412 (32.0)
Potato crisps	621 (48.3)	665 (51.7)
Popcorn	926 (72.0)	360 (28.0)

In our study, most caregivers provided their children with an RTEBC low in fibre and nutrients (median −1), and although the RTEBC of choice was Weet-Bix (51.4%), which is high in fibre, it has a high GI. Warren[29] recommended that children consume low GI breakfast food to improve satiety and portion control during lunch. Low GI foods also assist in improving cognition[45] and can consequently help with concentration at school.

Reduced fat milk and milk-derived products are seen as an essential component of a healthy breakfast.[17,18] The calcium in dairy products contributes to more than 50% of the total daily calcium intake and is necessary for growth and development.[46] In this study, the consumption of milk for breakfast was considered adequate, with a median intake of 5. The majority of caregivers provided full-cream milk (86.4%) and considered it as the healthiest option for their child (80.0%).

The intake of milk with breakfast in our study was comparable with RTEBC milk intake in a European study, where 92.5% of adolescents consumed milk with their RTEBC.[47] However, only 50.4% of adolescents consuming bread for breakfast had milk with their bread, and 60.2% of adolescents who consumed other types of breakfast foods (breakfast containing no RTEBC or bread) had milk with breakfast.[47]

In addition to fibre-rich carbohydrate and reduced- fat milk or milk-derived product as part of a balanced breakfast, fruit is also an important component of a healthy breakfast.[17,18,24] The World Health Organization (WHO)/Food and Agriculture Organization recommended that fresh fruit and vegetables should form part of healthy snacks and meals.[48] Fruit and vegetables should mostly be eaten fresh and raw, as tinned vegetables contain added salts, dried fruit may have high amounts of added sugar and fruit juice lacks the fibre present in whole fruit.[2] As shown in Table 5, the median fruit intake with breakfast in our study was 2, while 37.3% of caregivers gave no fruit at all for breakfast. Michels *et al.*[47] reported that 13.4% of adolescents eating RTEBC and 9.5% of those not eating a RTEBC for breakfast consumed a fruit with breakfast. In a study in Ghana, 56.0% of adolescents ate fruit or vegetables daily.[49] This is more than in our study, but we did not consider daily fruit and vegetable intake apart from breakfast and lunchbox foods.[49]

To encourage children to eat breakfast, it has been recommended that families eat breakfast together.[18] Caregivers set the example by eating breakfast themselves.[50,51] However, less than a third of caregivers (32.2%) in our study ate breakfast with their children before school. Time constraints in the morning may influence a family's opportunity to eat breakfast.[52] Neumark-Sztainer *et al.*[53] reported that family meal frequency in adolescents from a lower SEB (38.8%) was lower than those from a higher SEB (76.3%). Conversely, families with a lower income in our study ate breakfast together significantly more often than families with a higher income (34.5% and 28.4%, respectively; $p = 0.3$).

Lunchbox foods

Both international[10] and national[54] studies agreed that there is a need for parents to prepare healthier lunchboxes. The foods learners take to school are mainly processed foods including white bread, candy and potato crisps.[54]

Learners spend approximately a third of their day at school in South Africa, and those attending Quintile 5 schools do not receive meals at school. Consequently, a school lunchbox provides an essential contribution to the daily nutrient intake of a learner[55] and promotes optimal health.[56] Regularly taking a lunchbox to school increases the variety of food eaten and improves weight management of children.[13] In our study, 96.2% of learners took a lunchbox to school, which was more than described in a study by Abrahams *et al.*[13] and Shisana *et al.*,[40] with 69.0% and 37.6%, respectively, of learners in their studies taking a lunchbox to school. Abrahams *et al.*[13] completed a study on grade 4 (10-year-old learners) and Shisana *et al.*[40] on children aged 10–14 years at schools from a lower SEB in Cape Town. Our study was conducted at schools from a higher SEB where the National School Feeding Programme (NSFP) does not apply.

A healthy lunchbox is recommended to contain a fruit or vegetable or both,[48] a dairy product (preferably reduced fat),[57–59] water[58,60] and a fibre-rich, carbohydrate-rich food.[2,35] Recommendations from the 2015 to 2020 Dietary Guidelines for Americans state that a healthy-eating pattern should also include lean protein foods and meat alternatives.[32] However, the inclusion of processed foods in the lunchbox, although convenient, should be limited.[2,61,62]

Although most of the components of the lunchboxes in our study were scored to be unhealthy, the majority of the caregivers provided fruit in the lunchbox on some or all days of the school week (median 3). In our study, 33.5% of caregivers provided fruit five days a week and 43.2% provided fruit 1–4 days in a school week, while 22.9% provided no fruit at all. This was higher than reported by Hubbard *et al.*,[58] where 29.0% of learners received a fruit for lunch and 25.0% for a snack, keeping in mind that school a school day in the USA is longer than in SA. Abrahams *et al.*[13] reported that 9.0% of the learners from a lower SEB background in their South African study brought fruit to school.

The South African Food-Based Dietary Guidelines (SAFBDG) highlight the important role of fruit and vegetables in the prevention of diseases of lifestyle and recommend the intake of 'plenty vegetables and fruit every day'.[2] Eating fruits and vegetables does not only improve micronutrient intake but also affects the microbiome through the provision of dietary fibre that reduces the risk of diseases of lifestyle.[63] In our study, 25.2% of caregivers included a vegetable one to four days of a school week while only 4.2% included a vegetable in the lunchbox five days a week. Furthermore, caregivers with a higher qualification provided fruit and vegetables more often in the lunchbox. This was higher compared with Hubbard *et al.*,[58] who reported that only 3.0% of learners received vegetables for lunch and 1.0% received vegetables as snacks for school.

International studies have shown that children from a lower SEB tend to eat fewer fruits and vegetables and more 'convenient' type of foods.[3,10] In our study, the trend was no different, with children from homes with a lower income receiving tuckshop money and fast foods more often than children from homes with a higher income.

An adequate dairy intake is important for establishing peak bone mass from infancy to the beginning of maturity.[64] To establish peak bone mass, calcium, phosphorus and vitamin D act collectively to promote bone health,[65] all of which are present in milk.[66] In our study, less than half of the learners (42.6%) had dairy products included in their lunchbox, but most learners received water (77.9%). The provision of water as part of the school lunchbox in our study was higher when compared with the findings by Hubbard *et al.*,[58] where only 3.0% provided dairy and 28.0% provided their child with water. The SAFBDG and the American dietary guidelines recommend drinking clean, safe water as fluid source to optimise health,[36,60] with a fluid intake of 1.7 litres per day recommended for children 4–8 years of age.[2]

In our study, bread and biscuits provided for lunchboxes were low in fibre (median 0 and 1, respectively). Better choices that are higher in fibre, such as bran muffins and bars, were provided (median 5 for both), but less healthy treats were packed into the lunchbox (median 0), such as potato crisps and candy. These findings are of concern because fibre is an important component of a healthy, diverse diet. A diet naturally high in fibre is typically lower in fat and energy, which assists in achieving or maintaining a healthy bodyweight.[67] In addition, there is also an association between a diet high in fibre and a lower risk of developing cardiovascular disease (CVD), diabetes and constipation.[67]

In our study, potato crisps (51.7%) were the most popular treat added to the lunchbox, followed by candy (37.3%), dried fruit (35.8%) and nuts (32.0%). Hubbard *et al.*[58] found that learners brought the following treats for snacks: potato crisps 18.0%, candy 11.0%, dried fruit 1.0% and less than 1% nuts. This is important if one considers that in the USA learners are provided with lunch and snacks at school and therefore do not need to take snacks to school. Although caregivers in our study provided their children with more potato crisps and candy, the percentage of caregivers providing dried fruit and nuts was also higher than the study in the USA by Hubbard *et al.*[58]

We found that protein foods packed in lunchboxes were mostly cheese (62.0%), processed meat (57.3%), red meat (43.0%) and chicken (33.2%). Hubbard *et al.*[58] measured only whether the bread provided had a protein filling, and if a protein food was provided in the lunchbox. Processed meat had been provided in lunchboxes by 57.3% of caregivers, which was notably higher than the 36.0% reported by Abrahams *et al.*[13]

The inclusion of processed foods in the lunchbox (crisps, refined carbohydrates and processed meats) is often convenient, but should be limited.[2, 63, 68] Processed foods are generally high in fat, sugar and salt, with inadequate amounts of micronutrients, and could contribute to the prevalence of obesity among children in low- and middle-income countries.[2,30,63]

In general, it has been found that parents and caregivers are well aware of the benefits of packing a healthy lunchbox, but the biggest challenge was the lack of preparation time and effort required to pack lunchboxes.[69] In our study, 61.1% of caregivers indicated that it took them less than 15 minutes to pack lunchboxes.

Therefore, it is evident that dietitians can aid caregivers by giving them more practical, healthy ideas on what to pack in lunchboxes. If caregivers know what to provide, they may find packing lunchboxes less time-consuming.

Conclusions

Most caregivers seem to have a positive attitude towards healthy food and perceive healthy food as tasty, but do not

provide their children with healthy food for breakfast or in their lunchboxes. Caregivers from all SDV backgrounds had a positive attitude towards the importance, cost and health benefits of providing breakfast. Nevertheless, caregivers with a higher income and those living with a life partner perceive healthy food to be more expensive than less healthy food and that lunchbox preparation contributes to an additional workload. Provision of less healthy breakfast and lunchbox foods may be due to a nutritional knowledge gap.[70] Numerous studies have indicated that parental involvement and leading by example contribute to establishing healthy-eating habits in children[1,2] Therefore, it is evident that intervention studies should focus on improving nutritional knowledge of not only the learners, but also their caregivers. This could be achieved by writing lay articles for school newspapers and popular magazines, and giving nutrition-related presentations at parents' school meetings.

Limitations of the study

The questionnaire used to collect the data was not available in all 11 official languages of SA, and therefore caregivers could have misunderstood some instructions, consequently not responding accurately to the questions. The portion sizes of the food included for breakfast and lunchboxes were not measured, and intake could therefore not be compared with the recommended dietary allowances.

Acknowledgements – The authors acknowledge the participating schools, teachers and caregivers for their time and effort given to take part in our study; and Dr Daleen Struwig, medical writer/editor, Faculty of Health Sciences, University of the Free State, for technical and editorial preparation of the article.

Disclosure statement – No potential conflict of interest was reported by the authors.

Data availability – Data are available from the corresponding author upon reasonable request.

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Received: 30-08-2021 Accepted: 26-02-2022