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Research

Meal provisioning at early childhood development (ECD) centres: Perceptions and practices of caregivers and ECD staff in Gauteng Province, South Africa

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Background

Early Childhood Development (ECD) centres serve as a strategic setting to stimulate young children's healthy eating habits. Discrepancies in food provisioning practices of caregivers at home and ECD staff can jeopardise efforts to eradicate malnutrition in young children.

Objective

To describe and compare caregivers' and ECD staff perceptions of meals provided at ECD centres and feeding practices.

Methods

Design: Observational, cross-sectional descriptive study. *Setting*: ECD centres (N=15) in the City of Tshwane Region 1, Gauteng, South Africa. *Subjects*: Multistage sampling was used to select caregivers of children attending ECD centres (N=214) and ECD staff (N=45). *Outcome measures*: Perceptions of meals provided at ECD centres and child feeding practices were assessed by requesting participants to fill out self-administered questionnaires. Non-parametric Mann-Whitney tests compared the two groups of respondents at a significance level of 0.05.

Results

Only 40.7% of caregivers were aware of the specific foods served at ECD centres, yet all assumed the meals were healthy. ECD staff acknowledged their dual responsibility with caregivers for providing healthy meals (p= 0.011). Caregivers supported the idea of being involved in menu planning (p=0.031) and believed that ECD meals should provide at least half of a child's daily nutrition (p=0.021). Healthy eating environments were promoted more by ECD staff than caregivers, some of whom indicated that they provided snacks whenever children asked for it (p<0.001), allowing children to eat or snack freely (p=0.002 and p<0.001 respectively); or gave food to soothe fussiness (p=0.003). Caregivers used food as a reward or punishment significantly more often by withholding sweets for bad behaviour (p=0.004) or offering favourite foods for good behaviour (p=0.013). ECD staff were more likely to discuss the importance of healthy eating with the children (p=0.026).

Conclusions

The findings suggest that there is poor communication between ECD centres and caregivers, resulting in differing views of ECD staff responsibilities. The use of different feeding practices at home and at ECD centres might confuse children. Some caregiver practices may put the child at risk of developing poor eating habits, possibly leading to obesity or malnutrition. Consistent feeding practices and the provision of a variety of foods to children, can be utilised to support healthy eating. Continuous training in the implementation of the ECD nutrition guidelines and particularly in the upscaling of interventions to educate caregivers is crucial to foster healthier eating habits among young children.

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INTRODUCTION

Children in South Africa face a triple burden of malnutrition, characterized by undernutrition, micronutrient deficiencies, and overweight. The persistently high prevalence of underweight and stunting (29%) among children under five is indicative of chronic malnutrition. Conversely, approximately 23% of children under five are overweight, highlighting the dual challenge of undernutrition and overweight (Slemming et al. 2024; Department of Social Development and UNICEF, 2015). This third manifestation of malnutrition is also linked to serious adverse outcomes, such as the development of non-communicable diseases (Slemming et al. 2024; Simelane et al. 2023). World Health Organization (WHO) identifies ages 0-5 years as critical for preventing malnutrition. Stunted children aged 50-59 months lags 5-6 months behind their peers in development and while physical stunting can be somewhat reversed up to about age 5, educational delays often persist. (WHO, 2018; Hall et al. 2024).

An early childhood development (ECD) census conducted in 2021 showed that 1,660,316 South African children were enrolled for ECD programmes (Department of Basic Education, 2022). ECD centres play a critical role in the lives of young children, particularly those from low-income households, by providing daily meals and structured care during a crucial period of growth and development. By targeting malnutrition through ECD settings, interventions can contribute to long-term health and improved educational outcomes, making them a pivotal platform for early nutritional support (Slemming et al. 2024; Department of Social Development and UNICEF, 2015).

Food provisioning within the ECD centre context is complex. Not only is the type of food served important, but also the feeding practices followed during mealtimes, and the environment in which meals are served (Love et al. 2020). Child feeding practices involve specific behavioural approaches employed by caregivers to regulate the amount and type of food children consume (Love et al. 2020; Derscheid et al. 2010). Responsive child feeding practices are more likely to encourage children to develop healthy eating habits. It involves reciprocity between child and caregiver, promoting self-regulation of intake, healthy eating behaviours, and acceptance of new foods (Love et al. 2020; McSweeney et al. 2016; Derscheid et al. 2010; Sisson et al. 2017). Non-responsive practices which lack reciprocity, include pressuring children to overeat, restricting access to palatable foods and using food as a reward or punishment (Love et al. 2020; Gubbels et al. 2015; Gubbels et al. 2016). Research indicates that many ECD staff employ responsive practices such as sitting together with children at the table and regularly discussing healthy eating habits, fostering an interest in healthy foods. However, less favourable practices such as avoiding reference to internal hunger or satiation cues have also been reported (Derscheid et al. 2010; Gubbels et al. 2015).

In South Africa, most of the registered ECD centres serve at least lunch and a snack to the children (Slemming et al. 2024; Department of Basic Education, 2022). Given the long hours children spend at these centres, ECD staff are likely to have a significant impact on children's eating habits (Department of Basic Education, 2022; Love et al. 2020; McSweeney et al. 2016; Mikkelsen & Mikkelsen, 2016; Statistics South Africa, 2018). To improve the nutrition services at ECD centres, the Department of Health released the Nutrition Guidelines for ECD Centres in 2016, which were aligned with the South African Paediatric Food-Based Dietary Guidelines (Department of Health, 2016; Vorster et al. 2013). These guidelines state that children aged one to five years need a variety of healthy food five times a day to ensure nutritional adequacy. Also included in these guidelines are aspects of responsive feeding to guide ECD staff in setting an example and guiding children in developing healthy eating habits. Aspects of non-responsive feeding are also referred to, for instance, that food should not be used as a reward or punishment (Department of Health, 2016).

It has been established that caregivers and ECD staff must work together closely to provide children with adequate nutrition in a consistent manner (Derscheid et al. 2010; Sisson et al. 2017). Nevertheless, there is a paucity of data on home caregivers' and ECD staff's perceptions of meals provided to children attending ECD centres. The present study provides some insight into the perspectives and practices of a select group of caregivers and ECD staff on food provisioning and child feeding practices, which could inform policymakers and enhance the efficacy of interventions targeting malnutrition.

METHODS AND METHODS

STUDY DESIGN AND SETTING

An observational, cross-sectional descriptive study was conducted at ECD centres in Tshwane Region 1, Gauteng Province, South Africa. The prevalence of stunting and obesity in Gauteng province are 34% and the majority (58%) of the population in this region lives in low-income households (National Department of Health et al. 2017).

SAMPLE SIZE AND SAMPLING TECHNIQUE

Sample size calculations were based on PASS software (PASS, 2021). The population consisted of 230 ECD centres with approximately 690 ECD staff members (three per centre), to estimate a mean response per 5-point Likert scale item using confidence intervals, assuming a standard deviation of one and finite population size of 690, a sample size of 43 ECD staff members produced a two-sided 95% confidence interval with a distance from the mean to the limits that was equal to 0,3.

ECD CENTRES: A sample size of 15 ECD centres was needed to obtain 43 ECD staff members. A list of ECD centres in the City of Tshwane Metropolitan Region 1 was obtained from the Gauteng Department of Social Development (DSD). Simple random sampling using the Microsoft Excel random number generation function was conducted at these ECD centres. The researcher contacted the selected ECD centres and screened them for eligibility (e.g., do they provide meals, their address, and their use of English). If they met the inclusion criteria, they were invited to participate in this study. If the sampled ECD centre did not meet the inclusion criteria or had participated in the pilot study, another ECD centre from the list was randomly selected.

ECD STAFF: Census sampling was used in ECD centres with three or fewer staff members. Simple random sampling was

used when the ECD centre had more than three staff members to ensure all ECD staff had an equal chance of participating in the study. A number was allocated to each ECD staff member to enable random selection. If the ECD staff member did not meet the inclusion criteria, another staff member was selected. ECD staff were included if they had worked at the ECD centre for at least three months.

CAREGIVERS: It was assumed that each ECD centre had an average of 30 children. The potential population size of caregivers was therefore estimated at 450. Assuming a 30% response rate, the expected sample size would be 135 caregivers. A caregiver was a biological mother or father, maternal or paternal family, foster or adoptive parent, as well as any other primary caregiver (Department of Social Development and UNICEF, 2015). Census sampling was used for ECD centres that had thirty children or fewer. Simple random sampling was used when ECD centres had more than thirty children. For ECD centres with more than 30 children, the researcher allocated a number to each class and thereafter one or two classes were randomly picked, depending on the number of children per class, in order to sample 30 children. The thirty caregivers per ECD centre who were selected received the questionnaire via the attending children.

DATA COLLECTION TOOL

A self-administered questionnaire (SAQ) was used. Currently, there are no validated and reliable questionnaires to determine the perceptions of caregivers and ECD staff members of meals provided to children attending ECD centres. Therefore, the SAQ was developed in accordance with the study objectives. The SAQ was based on the Nutrition Guidelines for Early Childhood Development Centres (Department of Health, 2016), the South African Paediatric Food Based Dietary Guidelines (Vorster et al. 2013) and current literature (Love et al. 2020; McSweeney et al. 2016; Mikkelsen & Mikkelsen, 2016; Derscheid et al. 2010; Sisson et al. 2017; Gubbels et al. 2015; Gubbels et al. 2016; Shumba et al. 2014).

The SAQ consisted of three sections: a socio-demographic section (eight closed-ended questions), perceptions of meals provided at ECD centres (nine questions), and perceptions of child feeding practices (11 categories, comprising 30 questions). Perceptions were rated using a 4-point Likert scale. A validated Child-care Food and Activity Practices Questionnaire (CFAPQ) compiled by Gubbels et al. (2015; 2016) served as a guide for the child feeding practices section, and the questions were adapted for the South African context (The SAQ was adapted for caregivers or ECD staff but contained similar questions).

Two experts in the field of childhood nutrition assessed the content validity of the SAQ before a pilot study. The pilot study was conducted in February 2022 at an ECD centre in the Tshwane-1 Region, which was excluded from the main study. The pilot study followed the same procedure as the main study. The feasibility of the study was assessed by documenting or recording the logistical arrangements required, the process of obtaining informed consent, distributing the SAQ, and completing the questionnaires. Face validity was assessed by ECD staff and a group of caregivers who commented on the layout, format, legibility, and procedure. Both groups completed the SAQ within 5-30 minutes. Minor changes were made based on the recommendations received from experts, ECD staff, and caregivers.

DATA COLLECTION

Data collection was conducted between March and April 2022. The researcher met with each ECD centre principal to distribute the SAQ during staff meetings or breaks. The informed consent forms and SAQ were provided in English, the primary medium of communication at the ECD centres. The researcher explained the study's purpose to the selected ECD staff. After completion, both documents were placed in a white envelope.

The informed consent form and SAQ for each caregiver were placed in a brown envelope and distributed to the selected children by the ECD centre principal. Caregivers were requested to complete the documents within two weeks and return them in sealed envelopes. After a week, the principal sent out reminders to encourage completion and return of the SAQs. Only questionnaires that had completed consent forms and answered all questions were used for data analysis. Afterwards, all participants received a small token of appreciation for their participation.

STATISTICAL ANALYSES

Microsoft Excel was used to capture the data. IBM SPSS Statistics for Windows, version 28 (IBM Corp., Armonk, N.Y., USA) was used for data analyses. Summary statistics described participants' perceptions. Specific hypotheses were not declared a priori, but associations between agreement/disagreement with perception items between caregivers and ECD staff members were assessed using Fisher's exact tests at a $p<0.05$ level of statistical significance. Fisher's exact tests were chosen when comparing this binary response between caregivers' perceptions because more than 25% of the cells had an expected count of less than five, invalidating the use of the chi-square test. For the perception items, which were initially recorded on a 4-point Likert scale, responses were collapsed into binary variables by combining strongly agree/agree and strongly disagree/agree.

Likert scale items with measured frequency of practices as well as agreement with feeding practices were regarded as ordinal scale items and compared using non-parametric Mann-Whitney tests between the two groups of respondents at a significance level of 0.05. The decision was made to treat the five-point Likert scale as discrete ordinal numerical variables, and thus non-parametric tests were used to compare distributions between groups. The median (IQR) response or count, and percentage agreement or disagreement response, were summarized by type of respondent. All statistical analysis results were regarded as exploratory, and trends in the results were noted.

ETHICS APPROVAL

Approval was obtained from the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Stellenbosch University (Ref: S21/09/169) and the Gauteng Department of Education (GDE) (Ref: 8/4/4/1/2). The

manager at each ECD centre provided permission to perform data collection. Written informed consent was obtained from all participants in the study. It included an explanation of the study objectives, risks, and confidentiality. Participation was voluntary, and the informed consent forms were separated from the SAQs before data capturing to ensure anonymity.

RESULTS

DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

Of the 450 SAQs sent to the caregivers, 263 were returned, a 58.4% response rate. However, 49 of these were excluded due to missing or incomplete consent forms or substantial missing data. As a result, 214 completed questionnaires were included in the final analysis. The majority of caregivers were mothers (n = 180; 84.1%), between the ages of 18 and 40 (n = 176; 83%), and 44.4% (n = 95) held a Grade 12 qualification. Caregivers were mainly unemployed, at 55.2% (n=117), and lived in low-income households, earning R0-R1600 per month (62.4%, n=137) (Table 1).

Table 1. Demographic characteristics of caregivers (N=214)

Variable		Number of caregivers (n)*	Percentage (%)
Relationship to child (N = 214)	Father	18	8.4
	Grandparent	12	5.6
	Mother	180	84.1
	Other	4	1.9
Age (N= 212)	18-30 years	87	41.0
	31-40 years	89	42.0
	41-50 years	27	12.7
	>50 years	9	4.2
Education level (N=214)	Grade 1-7	7	3.3
	Grade 8-11	50	23.4
	Grade 12	95	44.4
	Tertiary	62	29.0
Average monthly household income (n=213)#	No income	77	36.2
	R1-1600	60	28.2
	R1601-10000	52	24.4
	Above R10000	24	11.3
Employment (n=212)	Full-time	58	27.4
	Not employed	117	55.2
	Part time	37	17.5

* N- value differs due to some questions that were not answered by caregivers.
# The exchange rate was 1 USD = 17.93 ZAR

Most of the 45 ECD staff who completed the SAQ were employed as teachers (n= 34, 75.6%) and had a grade 8-12 level of education (n=25; 55.5%). All ECD staff were employed full-time, and most had been working at ECD centres for a period of one to five years (n = 22; 48.9%) (Table 2).

CAREGIVERS' AND ECD STAFF MEMBERS' PERCEPTION OF MEALS PROVIDED AT ECD CENTRES

Although 40.7% of caregivers (n = 87) had previously had the opportunity to observe the food served to their children, all participants (caregivers, 100%; ECD staff, 95.5%) were overall satisfied with the food provided. However, ECD staff indicated that each of the five food groups (Starchy food, dairy food, protein Food, vegetables, and fruits) was not served daily. The response "always" was selected by less than half of the ECD staff for the daily serving of dairy (42.2%), protein food (33.3%), and fruit (44.4%).

Table 3 presents the perceptions of caregivers and ECD staff regarding the meals provided at ECD centres. Participants reached a consensus that ECD centres play a crucial role in teaching children healthy eating habits. Statistically significant differences were established for three statements. More caregivers (94.4%) agreed that meals provided at ECD centres should provide at least half of a child's daily nutritional needs compared to 84.4% of ECD staff (p= 0.021). ECD staff disagreed that caregivers are solely responsible for providing healthy food (53.3% and 33.3%, respectively) (p = 0.011). Caregivers were more inclined to agree that they should be involved in menu planning (93.9% and 84.4%, respectively) (p = 0.031) (Table 3).

Table 2. Demographic characteristics of ECD staff (N=45)

Variable		Number of ECD staff members (n)	Percentage (%)
Gender	Female	44	97.8
	Male	1	2.2
Role at ECD centre	Teacher/Educator	34	75.6
	Cook	10	22.2
	General Assistant	1	2.2
Education level	Grade 1-7	1	2.2
	Grade 8-11	15	33.3
	Grade 12	10	22.2
	Childcare Certificates	14	31.1
	B.Ed. Degree	1	2.2
	Other Tertiary Education	4	8.9
Employment	Full-time	45	100.0
Period working at ECD centre	3 months to less than 1 year	10	22.2
	1-5 Years	22	48.9
	6-10 Years	6	13.3
	11-20 Years	5	11.1
	More than 20 years	2	4.4

CHILD FEEDING PRACTICES OF CAREGIVERS AT HOME AND ECD STAFF AT THE ECD CENTRE

Eleven categories of feeding practices, each with a set of questions about child feeding practices, were included in the SAQ. Lower medians indicated lower levels of agreement with the statement. Under the category of child control, ECD staff were significantly less likely to allow children to eat whatever food they chose (median 1.0 vs 2.0) (p = 0.002) or eat snacks (median 1.0 and 2.5) than caregivers (p < 0.001). According to statements about the eating environment, ECD staff were significantly more likely to acknowledge that the food provided was healthy (median 5.0 vs 4.0) (p < 0.001), but disagreed that many snack foods and sweets were available (median 2.0 vs 3.0) (p < 0.001). As part of emotion regulation,

ECD staff were less likely than caregivers to give a fussing child something to eat (median 2.0 vs 3.0) (p=0.003). Food was used more often by caregivers as a reward to influence their children. They were significantly more likely to withhold sweets in response to bad behaviour (median 3.0 vs 2.0) (p=0.004) or offer favourite foods in exchange for good behaviour (median 4.0 vs 3.0) (p=0.013). Under the category, teaching about nutrition, ECD staff were more likely to discuss the importance of eating healthy foods with children (median 5.0 vs 4.0) (p=0.015).

Table 3: Caregivers' and ECD staff perception of meals provided at ECD centres

Statement	Participants	N#	Disagree/ Strongly disagree		Agree/ Strongly agree		p- value
			(n)	(%)	(n)	(%)	
The meals provided at the ECD centres are healthy.	Caregivers	212	3	1.4	209	98.6	0.422
	ECD staff	45	0	0	45	100	
Unhealthy foods should be provided in limited or small amounts to the children attending ECD centres.	Caregivers	212	62	29.2	150	70.8	0.260
	ECD staff	45	17	37.8	28	62.2	
Meals provided at ECD centres should provide at least half of a child's daily nutrition, enabling her/him to grow and be healthy.	Caregivers	213	12	5.6	201	94.4	0.021*
	ECD staff	45	7	15.6	38	84.4	
It is the caregivers' responsibility and not the ECD centre to provide healthy meals to the children.	Caregivers	213	71	33.3	142	66.7	0.011*
	ECD staff	45	24	53.3	21	46.7	
ECD centres play an important role in teaching children healthy eating habits.	Caregivers	213	3	1.4	210	98.6	0.423
	ECD staff	44	0	0	45	100	
Caregivers should be involved in the planning of the ECD menu.	Caregivers	213	13	6.1	200	93.9	
	ECD staff	45	7	15.6	38	84.4	0.031*

*Indicates statistical significance with p ⩽0.05 (Fisher's Exact Test). # Number of caregivers differs per question, as some people did not answer all the questions

No significant differences were established between the reported practices of the caregivers and ECD staff pertaining to pressure to eat, encouraging balance and variety, monitoring, restriction of fatty foods, and child modelling. Although it was not statistically significant, caregivers were likely to involve children during food preparation activities (median 4.0 vs 3.0). Selected questions are presented in Table 4.

Table 4: Self-reported use of child feeding practices by caregivers (N=214) at home and by ECD staff (N=45) at ECD centre.

Category	Child feeding questions	Measure score[a]	Care-giver	ECD staff	*p*-value
Child Control	I let the children eat whatever they want.	Median (IQR)	2.0(1-3)	1.0(1-3)	0.002*
	I allow the children to eat snacks whenever they want.	Median (IQR)	2.5(1-3)	1.0(1-2)	<0.001*
	I allow the children to leave the table when they are full, even if the other children have not finished eating.	Median (IQR)	3.0(1-4)	1.0(1-3)	0.001*
Emotion regulation	When a child fusses, the first thing I do is to give him/her something to eat.	Median (IQR)	3.0(2-3)	2.0(1-3)	0.003*
Environment	Most of the food at the home/child-care centre is healthy.	Median (IQR)	4.0(4-5)	5.0(4-5)	<0.001*
	There are many snack foods and sweets available at the child-care centre/ home.	Median (IQR)	3.0(2-4)	2.0(2-3)	<0.001*
Food as a reward	I withhold sweets from the children in response to bad behaviour.	Median (IQR)	3.0(2-4)	2.0(2-4)	0.004*
	I offer the children their favourite foods in exchange for good behaviour.	Median (IQR)	4.0(3-4)	3.0(2-4)	0.013*
Teaching about Nutrition	I discuss with the children why it is important to eat healthy foods.	Median (IQR)	4.0 (4-5)	5.0(4-5)	0.026*
	I tell the children what to eat and what not to eat without explanation.	Median (IQR)	3.0(2-4)	3.0(2-4)	0.603
Pressure to eat	The children should always eat all of the food on their plate.	Median (IQR)	4.0(3-4)	4.0(3-5)	0.334
	If a child says, I'm not hungry, I try to encourage him/her to eat anyway.	Median (IQR)	3.0(2-4)	4.0(3-4)	0.009

Table 4. Continue

Category	Child feeding questions	Measure score[a]	Care-giver	ECD staff	*p*-value
Encourage balance and variety	I encourage the children to try new foods.	Median (IQR)	4.0(4-5)	4.0(4-5)	0.837
	I encourage the children to eat a variety of foods.	Median (IQR)	4.0(4-5)	4.0(3-5)	0.346
Monitoring	I keep track of the food children eat.	Median (IQR)	4.0(4-5)	4.0(3-5)	0.222
Restriction	If I did not guide or regulate the children's eating, they would eat too many junk foods.	Median (IQR)	4.0(3-5)	4.0(3-5)	0.491
	I have to be sure that the children do not eat too many high-fat foods (*boerewors*, *polony*, sausage) and sweets.	Median (IQR)	4.0(4-5)	4.0(3-4)	0.015*
Child Modelling	I eat the same food as the children at mealtimes.	Median (IQR)	4.0(4-5)	4.0(4-5)	0.486
	I try to eat healthy foods in front of the children, even if they are not my favourite.	Median (IQR)	4.0(4-5)	4.0(4-4)	0.130
Child involvement	I tell the children what I am doing during the preparation/serving/clearing of the food.	Median (IQR)	4.0(3-4)	3.0(2-4)	0.076

[a] The higher the score, the more the statement was agreed with.
- Child control and emotion regulation questions: 5-point Likert scale ranging from Never (1), Rarely (2), Sometimes (3), Often (4), always (5).
- Environment questions up to the child involvement questions: 5-point Likert scale ranging from Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5).

*Statistical significance with $p \leq 0.05$ (Mann-Whitney test).

DISCUSSION

To the best of our knowledge, this is the first study in South Africa to explore the perceptions and practices of caregivers and ECD staff regarding meals provided at ECD centres. The main themes emerging from the data emphasise the need for targeted interventions to educate caregivers and ECD centre staff to support a nurturing environment for young children in a coordinated manner. Caregivers and ECD staff held opposing perceptions about their dual responsibility to provide healthy meals. Limited communication between ECD centres and caregivers has likely contributed to inconsistencies between feeding practices at home and ECD centres, which may lead to confusion among children about nutritious food options.

Meals served at ECD centres can enhance children's nutritional status when they are served in a supportive eating environment that fosters healthy eating habits (McSweeney et al. 2016; Mikkelsen & Mikkelsen, 2016). Even though half of the caregivers had never seen the food served to their children, the majority of participants held the perception that the ECD centre served healthy meals.

Recent South African studies have observed that caregivers often serve meat, fruit, and vegetables infrequently due to financial constraints and cultural eating patterns. Against this background, caregivers lack the ability to discern between healthy and unhealthy foods (Mokone et al. 2023; Motebejana et al. 2022).

Caregivers in this study were primarily unemployed and reported a low monthly income; therefore, they needed to trust ECD centres to provide healthy meals. According to Statistics SA (2018), unemployment can have a negative impact on food security, leading to malnutrition. Schumba et al. (2014) concluded that caregivers may be sending their children to ECD centres to receive at least one nutritious meal per day.

While over half of all participants agreed that meals at ECD centres should provide at least half of a child's daily nutritional requirements, this may not be reflected in practice. ECD staff indicated that protein sources, dairy, and fruit were not necessarily offered daily. Indeed, Nzama & Napier (2017) and Pietersen et al. (2002) found that meals served at ECD centres often did not meet children's energy and micronutrient requirements. It is a matter of urgency that ECD staff receive continuous training and regular monitoring to comply with the ECD Nutrition Guidelines. Furthermore, health promotion activities at community-based health clinics should be intensified to empower caregivers with the knowledge needed to ensure their children are protected from malnutrition (Mushaphi et al. 2015). Motebejana et al. (2022) found that caregivers lack the nutritional knowledge to identify foods within the same food groups.

LIMITED COMMUNICATION LIKELY CONTRIBUTED TO CAREGIVERS' LIMITED INVOLVEMENT IN MENU PLANNING AND MEAL PROVISION

Most caregivers felt the need to be more involved in menu planning at the ECD centres. Caregivers' involvement in ECD centre planning activities could enhance interaction and communication between the two groups (Sisson et al. 2012; Slemming et al. 2024; Nzama & Napier, 2017; Pietersen et al. 2002; Lindsay et al. 2016; World Health Organization et al. 2018). ECD centres should provide parents with regular updates on the type of food served and nutritional information. To improve communication and involvement, ECD centres should involve selected caregivers in menu planning and provide opportunities for them to observe food preparation, as well as hold intermittent meetings.

CAREGIVERS AND ECD STAFF DISAGREED THAT IT IS SOLELY CAREGIVERS' RESPONSIBILITY TO PROVIDE HEALTHY MEALS

While caregivers often perceived themselves as solely responsible for providing nutritious food to their children, ECD staff expressed a different perception. This difference underscores the ECD staff's commitment to the well-being of the children in their care. Conversely, Sisson et al. (2012) observed that childcare educators perceived their

responsibility to be teaching children social norms and preparing them for school, rather than emphasising the promotion of healthy eating habits. Several studies have demonstrated that both ECD staff and caregivers recognise the value of ECD centres in exposing children to a variety of foods and imparting important social norms (Mikkelsen & Mikkelsen, 2016; Derscheid et al. 2010; Lindsay et al. 2016). Shumba et al. (2014) noted that parents did not have a comprehensive understanding of the role that ECD centres play.

INCONSISTENT FEEDING PRACTICES MAY CONFUSE CHILDREN ABOUT HEALTHY AND UNHEALTHY FOODS

Statistically significant differences between the feeding practices at home and ECD centres were identified. Feeding practices used by either group may have an impact on a child's weight, food preferences and long-term health (McSweeney et al. 2016; Mikkelsen& Mikkelsen, 2016; Pietersen et al. 2002); lack of consistency may create confusion for children. However, practices acknowledged by caregivers may indicate that the home environment is not as conducive to the development of healthy eating habits. For example, parental feeding practices that are unresponsive to a child's internal cues may encourage children to eat for reasons other than hunger, altering their ability to regulate their energy intake in the long term (Britto et al. 2017; Byrne et al. 2022).

Better consistency could be achieved through stronger communication and collaboration between caregivers and ECD staff. By working together, setting joint goals, and maintaining open communication, they can promote children's nutritional development, ensuring a consistent and supportive environment both at home and in the ECD centre (Love et al. 2020; Derscheid et al. 2010; Sisson et al. 2017).

The Nutrition Guidelines discourage the use of food as a reward or as punishment at ECD centres. Effective caregivers observe and interpret their children's cues, responding consistently and appropriately (Department of Health, 2016). Caregivers in this study reported employing strategies including child control, emotion regulation, and the use of food as a reward to encourage good behaviour (Department of Health, 2016). Practices like reward-based and emotional feeding are associated with changes in children's food preferences, dietary intake, and weight status. Insufficient reinforcement of these feeding practices at home may affect the development of healthy eating behaviours and could increase the risk of malnutrition (Love et al. 2020; Derscheid et al. 2010; Gubbels et al. 2015; Gubbels et al. 2016; World Health Organization et al. 2018).

Though it is unclear to what extent caregivers in this study would involve children in meal preparation, research confirms that shared activities positively influence eating habits and help to develop food preferences crucial for their growth and development (Gubbels et al. 2015). For example, modelling practices such as eating the same food as children during mealtimes have been linked to a reduced consumption of unhealthy food by children (Mazza et al. 2022). Gubbels et al. (2015) described how preschool teachers added an enthusiastic statement about the food they were eating, 'Mmm! I love orange!', which increased children's acceptance of food.

According to the responses to the SAQ, ECD staff create a healthier environment with more healthy food options, while caregivers' homes often have both healthy and unhealthy food options. Still, both groups received high scores for their statements about encouraging balance and dietary variety. Exposure to a variety of healthy foods can promote healthy nutritional intake and the development of positive associations with healthy foods. In particular, children tend to eat more vegetables when encouraged to eat all the food on the plate (Quah et al. 2018; Sisson et al. 2017; Black et al. 2017; Gubbels et al. 2015; and Love et al. 2020).

Although there were no significant differences between caregivers' and ECD staff's practices in teaching children about nutrition, the majority of participants were more inclined to tell children what to eat without providing explanations. Although parental participation and reinforcement of healthy eating behaviours at home are essential for developing healthy eating habits, caregivers may lack certain types of knowledge. Mokone et al. (2023) found that 77% of caregivers in a Gauteng study were unaware of the difference between healthy and unhealthy foods (Sisson et al. 2017; Mokone et al. 2023).

Both participant groups regulated the type and quantity of food consumed by children, either to prevent overconsumption of specific foods or to encourage increased intake. Participants need to exercise caution when restricting or promoting certain foods, ensuring that explanations are provided so that children understand and internalize the reasons for these restrictions. Restricting access to foods inadvertently makes them more appealing, leading children to eat those items in excess when available (Love et al. 2020; Byrne et al. 2022; Black et al. 2017). These feeding practices can hinder children's ability to self-regulate food intake, often resulting in poor appetite control and ultimately an increased risk of overeating (Love et al. 2020; Gubbels et al. 2015; Gubbels et al. 2016). Interventions for early learning should focus on parental support and enhancing ECD staff's abilities to provide a caring, safe, and emotionally positive environment (Sisson et al. 2017; Black et al. 2017).

Both caregivers and ECD staff monitored the food that the children consumed. Love et al. (2020) and Byrne et al. (2022) emphasise the importance of daily monitoring to provide feedback to caregivers. By tracking food intake, caregivers can limit under- or overeating, identify when children need feeding assistance, and ensure they consume a balanced diet (Mazza et al. 2022; Byrne et al. 2022).

In conclusion, a multipronged approach is required to educate caregivers and support ECD staff to provide for the comprehensive needs of children. In South Africa, nutrition education has been designated as a vital element of the National Curriculum Framework for Birth to Four (Department of Social Development and UNICEF, 2015). Increasing access to training opportunities for ECD service providers is of critical importance (Slemming et al. 2024; Gubbels et al. 2015). Furthermore, it is crucial to provide nutrition education to caregivers to reinforce the development of healthy eating habits (Sisson et al. 2017). The South African Early Childhood Review 2024 recommends increasing social assistance, allocating an additional budget to expand coverage of the ECD subsidy, and expanding

home-based community health services. ECD programmes necessitate parent support programmes, ensuring that both are responsive to the diverse needs of our communities (Hall et al. 2024).

LIMITATIONS

Validation of the SAQ was beyond the scope of this study; therefore, content and face validity were assessed during the pilot study to optimise clarity, impartiality, and conciseness of the questions. Despite these efforts, it is acknowledged that the way in which two questions pertaining to perception were phrased could be ambiguous. Assumptions in how participants interpreted these questions could have led to misinterpretation by the respondents. The two questions are "Unhealthy foods should be provided in limited or small amount to the children attending ECD centres" and "It is caregivers' responsibility and not the ECD centre to provide healthy meals to the children." It is recommended for future studies to validate questionnaires to prevent misinterpretation. The research was conducted in only one subdistrict of Tshwane using a relatively small sample size; therefore, the results cannot be generalised. Because the study was cross-sectional, no conclusions about causality can be drawn.

Self-administered questionnaires have the limitation that the researcher is unable to monitor, offer clarification, or encourage respondents to complete the questionnaire. The SAQ was returned in sealed envelopes; therefore, there was no opportunity to check the responses for completeness. Although the ECD centres selected had English as their preferred language, the home language and educational levels of caregivers might have created barriers to completing the SAQ and somewhat biased our sample.

As in all questionnaire-based research, respondents might not have answered honestly because they wanted to appear socially acceptable, e.g., wanting the ECD staff or principal to think that they are satisfied with the meals provided at ECD centres.

The study did not determine whether caregivers provided all five food groups daily, missing the opportunity of identifying possible deficiencies and providing more tailored recommendations for strategies.

CONCLUSION

The present study's key findings indicated that both caregivers and ECD staff generally regard meals provided at ECD centres as healthy. However, caregivers' limited involvement in menu planning and insufficient awareness of the specific meals served at ECD centres may have influenced their perceptions. Responsibility for providing healthy meals is shared between ECD staff and caregivers, yet significant differences exist in their perceptions and practices related to child feeding. While ECD staff tend to emphasise a healthy environment and educating children about nutrition, caregivers are more inclined to use food as a reward or as punishment. Most caregivers and ECD staff concurred that ECD centre meals should provide at least half of a child's daily nutritional requirements, underscoring the need for collaborative efforts in promoting healthy eating habits. As detailed in Box 1, these themes emphasise the need for targeted interventions to educate both groups, thereby fostering a nurturing environment for young children through coordinated action. To achieve the goal of eradicating malnutrition in children under five by 2030, strict enforcement of existing government policies and guidelines is crucial.

Box 1. Recommendations to improve perceptions and practices of caregivers and ECD staff about child feeding

ECD CENTRES AND CAREGIVERS

- Collaborative discussion to clarify roles of their dual responsibility for healthy meals will develop healthier dietary habits in children.
- Adopt consistent feeding practices to support healthy dietary behaviours through regular meetings and sharing of information.
- Conduct caregiver-teacher conferences to provide nutrition education, which would facilitate the alignment of approaches to promote healthy eating.
- Provide regular updates about menus and opportunities to observe mealtimes, to enhance transparency, trust, and informed decision-making by parents.
- Consistent messages and food options promote healthy eating habits, and caregivers could learn from ECD staff.

GOVERNING BODIES

- Disseminate the nutrition guidelines for food provisioning at ECD centres to all registered and unregistered centres, accompanied by continued staff training and monitoring.
- Dietitians employed by the Department of Health can conduct nutritional analyses of ECD menus.
- The DOH and Department of Basic Education conduct plate wastage studies intermittently to assess children's actual intake.

FUTURE STUDIES

- Explore children's dietary intake alongside staff feeding practices, supplemented by qualitative focus groups to identify the barriers and enablers to develop science-based perceptions and practices around child feeding and nutrition at ECD centres
- Validate the CAFPQ tool for the South African population to improve assessment of feeding practices at ECD centres

AUTHOR CONTRIBUTIONS

SEN: Conceptualization, Methodology, Investigation, Data curation, Writing-original and draft preparation. YS: Conceptualization, Methodology, Supervision, Writing-reviewing and editing. TME: Statistical analysis, interpretation, Writing-reviewing and editing. All authors have read and approve the final version of the paper and its submission.

CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN SCIENTIFIC WRITING

AI (ChatGPT) was used for language editing. the authors take full responsibility for the content of the article.

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