

The banana project: a qualitative study of caregivers' and teachers' experiences of preschool children participating in a free banana school fruit scheme in rural Tanzania

Anne Katrine Sandnes Ebitu,¹ Liv Fegran,¹ Kristin Haraldstad,¹ Berit Johannessen,¹ Mercy Grace Chiduo,² Olav Johannes Hovland ¹

To cite: Ebitu AKS, Fegran L, Haraldstad K, *et al.* The banana project: a qualitative study of caregivers' and teachers' experiences of preschool children participating in a free banana school fruit scheme in rural Tanzania. *BMJ Nutrition, Prevention & Health* 2022;0:e000403. doi:10.1136/bmjnph-2021-000403

¹Department of Health and Nurse Sciences, University of Agder, Kristiansand, Norway
²National Institute for Medical Research, Tanga Research Centre, Tanga, United Republic of Tanzania

Correspondence to

Professor Olav Johannes Hovland, Department of Health and Nurse Sciences, University of Agder, Kristiansand, Norway; johannes.hovland@uia.no

Received 1 December 2021

Accepted 16 June 2022



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

ABSTRACT

Introduction Good nutrition is the foundation of sustainable growth and development among children. The United Nations aims to achieve food security and improve nutrition through its Sustainable Development Goal 2 - Zero Hunger. In close collaboration with local communities and authorities, the Tanga International Competence Centre, Tanzania, supports projects aimed at achieving the United Nations Sustainable Development Goals. One of their initiatives, The Banana Project, which is a free school fruit scheme, started in 2011 based on a recognised need for nutritional support among preschool children at a rural school in Tanga District. In the interest of improving nutrition, the free school fruit scheme provides one banana 5 school days a week to each child in the class. This study aimed to explore caregivers' (parents and/or guardians) and teachers' experiences with preschool children's participation in the project, with a specific focus on nutrition and health.

Methods This qualitative study was performed in 2017. A total of 16 semistructured indepth interviews with 14 caregivers and 2 teachers of the preschool children participating in the project were conducted. Data were analysed using a hermeneutic perspective.

Results Caregivers and teachers of the preschool children participating in the intervention experienced that bananas (1) reduced children's hunger and nutritional deficiency, (2) increased fruit intake and improved their appetite for other foods, (3) improved their physical health and provided energy, and (4) supported cognitive and socioemotional development.

Conclusion These findings indicate that the banana intervention has several benefits to preschool children and has an impact on their families. To improve health and reduce the risk of malnutrition of children in rural Tanzania, The Banana Project can be an recommended as a simple, cost-effective and sustainable health and nutrition promotion initiatives.

INTRODUCTION

Good nutrition is the foundation of sustainable growth and development of individuals and communities, whereas malnutrition is

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Malnutrition is an obstacle to sustainable growth and development among children.
- ⇒ School fruit schemes are among the many initiatives to meet the global malnutrition challenge.

WHAT THIS STUDY ADDS

- ⇒ School fruit schemes, adapted to local conditions, are beneficial to children, their families and the communities.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ School fruit schemes are simple, cost-effective and sustainable health promotion initiatives.

the leading contributor to the global burden of diseases.¹ Globally, 194 million children under 5 years are stunted or wasted.² Nutrition pervades all aspects of children's health, growth, cognitive and social development. Malnutrition can lead to irreversible and life-long negative health effects.^{2,3} The United Nations aims to strengthen the nutrition and health opportunities for children through its Sustainable Development Goal (SDG) 2 - Zero Hunger and highlights the need for global efforts to overcome nutrition-related challenges.⁴ To achieve the SDGs globally, local community participation is important.⁵ The Tanga International Competence Centre (TICC), Tanzania,⁶ supports SDG-targeted projects in cooperation with regional authorities and local communities. One such cooperation is The Banana Project (TBP), a free school fruit scheme (SFS) which provides bananas on each school day in a preschool class. The project was initiated in 2011 based on a recognised need for nutritional support among preschool children at a rural school

in Tanga District. Due to its success, TBP was expanded to include the primary school, benefiting approximately 900 children.

TBP aimed to improve diet quality and nutrition of children, as well as address social health inequality, as the fruit was provided to all children in the class. The recommended sufficient daily consumption of fruits and vegetables is 400 g per capita per day⁷ and this is a challenge in Sub-Saharan Africa.⁸ TBP chose bananas because they were readily available, hygienic, satiating and nutritious. Bananas contain sucrose, fructose, glucose, fibre, vitamins A and B₆, iron, calcium, and tryptophan.⁹ Together with iodine, vitamin A and iron are the most important micronutrients in global public health terms,² and the local price, availability and overall quality of bananas make them suitable for improving diet quality and nutrition in children.

To our knowledge, this study is the first in Tanzania to qualitatively explore caregivers', defined as parents or guardians, and teachers' experiences with children's participation in an SFS. Caregivers' nutrition education, access to nutrition and feeding practices are important in relation to children's nutrition.¹⁰⁻¹² Caregivers and teachers are responsible for children at home or at school. However, limited evidence is available from Sub-Saharan Africa regarding how caregivers and teachers experience such schemes. Their experiences are important given that the sustainability of these initiatives depends on them.

Interviewing caregivers and teachers about their experiences regarding children's participation in TBP may enable research in new related areas or provide new insights into the outcome of children's participation in an SFS. Thus, this study aimed to explore, with a specific focus on nutrition and health, the research question 'How do caregivers and teachers experience the preschool children's participation in TBP?'

METHODS

Research design

A qualitative design was selected to explore participants' experiences. The information provided by the participants was interpreted and understood through a hermeneutic perspective, where related narratives were clustered together and used to build coherent descriptions of the phenomenon studied.¹³⁻¹⁵

Study setting

This study was conducted in Tanzania at a preschool in the rural outskirts of Tanga City where TBP had been implemented by the TICC. The preschool was chosen as TICC already had a collaboration with the school, to carry out school health check-up. Although Tanzania is a low-income country, there has been improvement in its Human Development Index.¹⁶ Still, almost 70% of the population live on less than US\$1.25 a day. Most people live in rural areas with lower access to healthcare, education, water and sanitation than in rural areas. Education

level after primary school is very low, with a total of 10 605 430 students in primary and 185 037 students in secondary school (2019).¹⁷

Intervention

TBP provided one free banana 5 school days a week to every child in the preschool class. The preschool teachers distributed the bananas in their classroom at lunchtime and led the children in songs with movements and told stories about being healthy and eating healthy food.

Participants

Access to the study population was gained through the TICC and current school. A purposive sampling strategy was used.¹⁵ Participants were caregivers and teachers of children in the preschool class where TBP was implemented. Eligibility criteria for participating caregivers included (1) being the primary caregiver of at least one child in the preschool class, (2) aged above 18 years, (3) living in the same household as the preschool child/children, (4) being able to answer in English or Kiswahili, and (5) able and willing to provide informed consent. Caregivers of preschool children who had attended the preschool for ≤6 months were not eligible. No gender-specific criteria were used to determine eligibility. Efforts were made to obtain the most even gender distribution and spread of age, socioeconomic status and religion. Invitation letters in Kiswahili with information about the study were distributed to the respective caregivers by the head preschool teacher, as he was most knowledgeable about where they lived.

The eligibility criteria for participating teachers included (1) being a teacher of the preschool class, (2) having been with the children for ≥6 months, (3) being able to answer in English or Kiswahili, and (4) willing to provide informed consent. Caregivers and teachers who expressed their willingness were invited to the school for an interview.

Data collection

Qualitative data were collected by the first author from 16 participants through indepth interviews.^{15 18} A semi-structured interview guide was used,¹⁸ starting with open questions about participants' background and relation to the child, continuing with descriptions of the child's eating habits and their home food situation, and moving on to open questions related to their experiences with the child's participation in TBP in relation to nutrition and health. All interviews were conducted in English and Kiswahili, which was the participants' native language, and consecutively interpreted by a competent interpreter. On completion of the 16th interview, thematic saturation was reached as no new themes, findings, concepts or problems were evident in the data.^{15 19}

Familiarity with the participants was enhanced by prior knowledge through earlier fieldwork in Tanga and the first author's years of experience with the East African culture. For instance, local clothing and greetings were

used to build relations and create trust. In addition, time was spent on observing the banana distribution in the classroom.

Data management and analysis

Audio recordings of the translated interviews were transcribed by the first author in English directly to Microsoft Word. To get a preliminary understanding before the structural analysis, all the interview transcripts were read through several times before being transferred to the data analysing software program NVivo V.11 Pro for coding and data analysis.²⁰ Data were analysed by meaning condensation, meaning interpretation and hermeneutic interpretation of meaning. By adding hermeneutic layers to understand the meaning,^{13 14 18} the codes of natural meaning units were developed into themes, which again were reviewed for the purpose of the study. Finally, the themes were abstracted to essences in wider themes and descriptive statements. Inspired by Brinkmann and Kvale,¹⁸ the data were interpreted by an increasing abstraction level from participants' self-understanding (condensed meaning units) to a critical common-sense understanding, and finally a theoretical understanding (Discussion section).

Methodological and ethical considerations

Verification of the research process was done through transparent description of the analysis process. The pilot interview resulted in changes, and the skilled interpreter, knowing the culture and setting, was taken into account and included in the interview process. The first author was conscious about the cultural and social diversity in the interview setting and facing the differences in native language. All the interviews were transcribed by the first author and read through several times. Moreover, the first interviews and transcriptions were validated by MGC, who is a native Swahili speaker. The themes were discussed and defined by authors' consensus.

All participants were provided written information in Kiswahili and a consent form, including digital recording and publication of the results, to be signed before the interview. At the location, the study procedures were explained in detail and the participants were assured their participation would not affect their relationship with the school, TBP or TICC.

RESULTS

Participants

Among the 16 interviewed participants (10 female and 6 male), 14 were caregivers and 2 were teachers. The caregivers represented 17 preschool children aged 3–7 years and had 1–5 children under their responsibility of care. Five caregivers were grandparents who took care of their grandchildren. Generally, the parents were more educated and of higher socioeconomic status than the grandparents, where all were illiterate and three of them had no occupation and three were widows. The reason

Table 1 Characteristics of caregivers (n=14)

Participants	n=14
Mothers	5
Fathers	4
Grandmothers	4
Grandfather	1
Age	
21–30	5
31–40	3
41–50	3
51–60	3
Marital status	
Married/cohabitant	9
Widowed	4
Single	1
Education level	
Illiterate	7
Literate*	1
Primary	4
Secondary	2
Occupation	
Craftwork	2
Religious	3
Elementary	2
Other†	1
None	3

*Literate, but no formal education.
†Occupation requiring secondary or higher, but title unknown.

why preschool children were living with their grandparents was either that they were orphans or that their biological parent(s) had left them for a new relationship/marriage or work in the city. Despite the latter, the grandparents reported little financial support to take care of their grandchild/grandchildren. The major characteristics of the caregivers are presented in [table 1](#).

The teachers included one single male and one married female teacher. One of them had a diploma in teaching and the other a certificate in children and youth work. Both teachers were aged 31–40 years and had been in the preschool class 2 and 5 years. The analysis of all the interviews with the guardians and teachers resulted in four themes summarised in [figure 1](#).

The perspectives of the biological parents and those of the grandparents differed in that the grandparents emphasised more the struggle of surviving and the heavy burden of taking care of young children, given their own age, health and limited resources.

The teachers had less experience with children's eating habits, nutritional status and physical health than the caregivers, but had more experience regarding children's

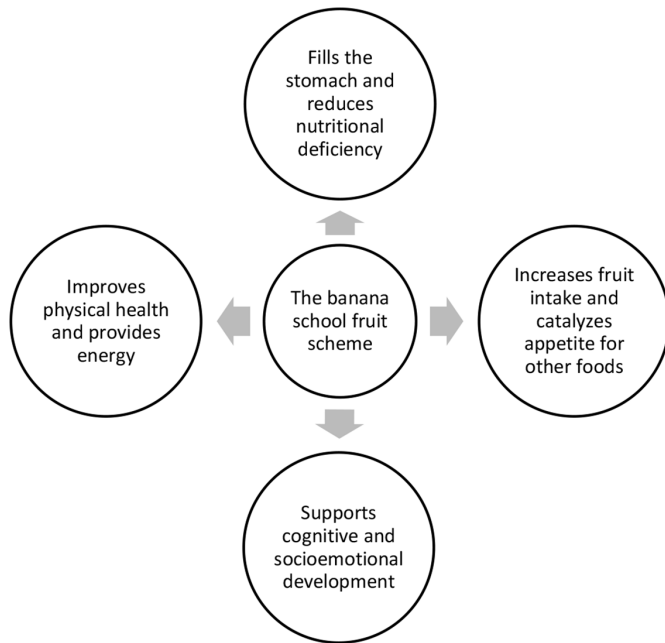


Figure 1 Caregivers' and teachers' experiences of preschool children's participation in The Banana Project in Tanzania.

energy levels at school, attendance, and cognitive and socioemotional development.

Reduces hunger and nutritional deficiency

All participants regarded TBP as a programme providing nutritional support to their children which may reduce hunger at school. They experienced that the bananas were a relief to them and improved their children's daily total nutritional intake. All caregivers reported limited household food security and challenges of providing healthy and varied foods, and therefore the bananas were of additional value to the children's daily needs. Children living with their grandparents appeared to be more vulnerable in this aspect due to the grandparents' socio-economic status:

The challenge that I am facing is the hardship of life. Sometimes, if I get money, the children can have tea in the morning. If they don't have tea, they come to school and get the banana, and then they come back for another meal perhaps, for any meal that is obtainable... (Grandmother 4)

The majority (57%) of the caregivers reported a capacity to provide two to three meals per day for their children, as the minority (43%) reported a limitation of one to two meals per day. For the poorest, the breakfast could be tea only or nothing at all. All participants reported experiencing that the bananas added nutritional value for the children, and for some it was also a relief to their insecure food situation:

The banana helps my child because he...doesn't sleep because of hunger... It helps me as a mother... it helps me that I don't have to find other ways of

giving something for the boy, because he eats the banana that is given in the school. (Parent 2)

The participants reported that for some children the bananas provided at school were their only access to fruits and therefore added nutritional value to their daily intake:

So even if at home...I don't have that ability to buy fruits, but at school, my grandchild gets the banana, so that's very good for his health, and of course nutritious condition. (Grandmother 1)

Increases fruit intake at home and improves appetite for other foods

Caregivers (71.4%) reported that the children's participation in TBP increased their intake of fruits at home and improved their appetite for other food items, such as porridge, rice, ugali, beans and vegetables. As a mother expressed:

My daughter didn't like porridge before she started school, but after one month of coming to school and getting the banana, she liked the porridge... And even if it's the weekend now, I must buy a banana for her so that she takes the porridge. (Parent 3)

Because the children talked about it and asked for bananas at home, their families consequently provided and ate more bananas and other fruits. One father described his preschool child as a 'public relations educator' for bananas at home:

So, my child, who is in this preschool class, now insists that we give his younger brother, who is at home, a banana a day... He is a 'public relations educator' now... (Parent 6)

Improves physical health and provides energy

All participants reported that TBP improved children's physical health. Changes such as weight gain, smoother skin, better digestion, increased sleep and higher immunity were cited. The mother of a girl who used to fall sick frequently said that the bananas helped restore her daughter's health:

Yes, the banana has helped my child because her health is now good. When she started school, she was sick and weak. But when she started to get the banana, her health improved. There is no weakness again. So, there is a very big improvement... (Parent 4)

Some parents and both teachers reported that there were visible and significant differences in children's health in this school compared with neighbouring schools and that the parents of children from those schools now wanted to transfer their children to this school because of this. Moreover, all participants reported that the bananas provided the children vitality, strength and energy for daily activities. The teachers also reported an improvement in the preschool class since the beginning of TBP:

So, there is a great difference, because they are taking the banana, and the banana helps them energetically to be extra cheerful, to be extra active. I could see that. But it wasn't this way before this banana system. But now many pupils are improving because of getting the correct fruit, which has a lot of energy and other vitamins. In the past, the children of this school were very sick, and they went to the dispensary, but nowadays that's not the case. (Teacher 1)

Supports cognitive and socioemotional development

All participants said that the bananas enhanced children's well-being and relations with their friends, as described by a father:

First of all, my child is always happy about the banana, because it keeps him healthy and psychologically fit, and whenever he comes back from school, he tells stories about the banana to me and his friends.... (Parent 8)

Furthermore, the caregivers and teachers reported that the bananas improved the children's learning, playing and concentration at school and home. The teachers also reported increased attendance in class and improved performance at school after the implementation of TBP.

DISCUSSION

This study aimed to explore caregivers' and teachers' experiences of preschool children's participation in TBP, with a specific focus on children's health and nutrition. The findings reflect that TBP has succeeded in being an important health promotion intervention for preschool children due to its nutritional and health benefits.

Earlier studies have reported that SFS provides health-promoting benefits.^{21 22} However, many of these studies have been conducted in high-income countries, where most of the participating children have their basic needs covered and the desired benefit is helping them achieve a healthy diet and avoid obesity. In contrast, the present study explored experiences from an SFS situated in a rural context in a low-income country, where the challenges of malnutrition and hunger are a reality for many children.

One finding in our study was that the participants experienced that TBP reduced hunger. This finding might be related to the guardians' generally low socioeconomic status and the challenges of providing healthy and varied foods. Three of the guardians were grandparents with no education or occupation generating income, which appeared to aggravate the already oppressively insecure food situation. Although the nutritional status of children in Tanzania is improving, recent reports show that Tanzanian children from rural areas and poor families are still at substantial risk of suffering from malnutrition.^{23 24} The participants' experience of the bananas reducing children's hunger may be a result of their known satiating property.⁹

Our findings show that the families eat more bananas and fruits at home, suggesting that the project impacts the whole family. The participants also reported that the children talked about bananas to family and friends. Findings from a study in New Zealand evaluating the impact of nutrition supplement schemes suggested that it is possible to improve the dietary habits of children and their families through such schemes.²⁵

All participants mentioned an improvement in children's physical health after they participated in TBP. Findings from low-income and middle-income countries support an association between chronic undernutrition and poor child development.^{26 27} The observed health changes might be related to bananas' stabilising nutrients in the body because many of these children were previously exposed to nutritional deficiency.²³ Another health-related finding is participants' experience that TBP had an impact on children's cognitive and socioemotional development. The teachers emphasised the increased attendance, performance and concentration at school, which is consistent with the findings of a study from South Africa.²⁸ In another study, the intake of raw fruits was associated with better mental health.²⁹

The experiences of TBP may be explained by the fact that it has been implemented for more than 6 years. Previous studies showed that SFS over time significantly improved children's nutrition.^{30 31} Another aspect of long-term sustainability might be related to bananas being provided as free nutritional support. Two studies from Norway found that providing free fruits to pupils at no cost to the parents is an effective strategy to improve children's fruit and vegetable intake.^{32 33} A systematic review and meta-analysis presented the same improvement in intake but argued for more research on all steps in the fruit and vegetable distribution interventions.³⁴ To increase and optimise the fidelity of and research on the interventions, one suggestion is to implement a process evaluation in the planning, implementation and outcome of the interventions.³⁵ To decrease undernutrition and increase the intake of fruits and vegetables, another aspect is to include and coordinate multiple sectors at the national, regional and local level. This coordination must include the education sector, caregivers, communities and gender equity.^{36 37} The findings from this simple and cost-efficient health promotion intervention may contribute to the establishment of other SFS in low-income and middle-income countries, especially knowing that children's development depends on adequate nutrition, nurturant caregiving and learning opportunities.^{38 39}

Study strengths and limitations

A strength of this study is that it evaluates an SFS in a low-income country where nutritional balance is a challenge. Studies like this from Sub-Saharan Africa are limited, but of importance in achieving SDG 2 in the region. Another strength is the focus on the experiences of the caregivers and teachers, as they are a determining factor for the sustainability of an SFS initiative.

Several factors might, however, limit the interpretation of the findings. Although 16 interviews may be considered adequate, only 2 of them were with teachers, making the caregivers' perspective dominant. However, this was expected because a limited number of teachers were eligible owing to the inclusion criterion of regular contact with the children.

Moreover, language barriers and use of an interpreter create a risk of misinterpretation and misunderstanding in the interview process.^{13 40} However, a senior research scientist from the National Institute for Medical Research in Tanga validated the first audio recordings and transcriptions of interviews to minimise the risk.

In the absence of an alternative, the recruitment of the caregivers by the head preschool teacher could potentially impair their independence concerning the image of the school or TBP. However, the teacher was not involved in the data collection process with the caregivers.

CONCLUSION

This study focuses on caregivers' and teachers' experiences with preschool children's participation in TBP, with a specific focus on children's nutrition and health. The findings indicate that TBP has succeeded in being an important health promotion intervention for preschool children due to its nutritional and health benefits impacting the whole family. The prevalence of malnutrition in rural Tanzania and the participants' reports may indicate that health promotion initiatives are highly important in promoting better health and nutrition. TBP appears to be a simple, cost-effective and sustainable health promotion initiative and an approach for recommendation to improve nutrition and health for preschool children in rural Tanzania and other similar contexts.

Twitter Anne Katrine Sandnes Ebitu @anne_ebitu

Acknowledgements The authors sincerely thank the participating caregivers and teachers for contributing to this research, as well as the TICC staff and management for practical support.

Contributors AKSE conceived and designed the study, and participated in data collection, data analysis and manuscript writing. LF, KH, BJ and OJH contributed to study conception, design and data analysis. MGC contributed to data acquisition, quality assurance of the translation from Kiswahili and data analysis. All authors are accountable for the published version of the manuscript. OJH is author responsible for the overall content as the guarantor.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Ethics approval This study involves human participants and was approved by the Norwegian Centre for Research Data (Ref ID #54747), and the Faculty of Health and Sport Sciences Ethical Research Committee, University of Agder, National Institute for Medical Research, Dar Es Salaam (Ref ID #NIMR/HQ/R.8a/Vol IX/2586). The study was exempted from ethical approval from the Regional Committees for Medical Research Ethics, Norway. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed by Upreti, Yadu Ram, Kathmandu.

Data availability statement No data are available.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iD

Olav Johannes Hovland <http://orcid.org/0000-0002-7458-696X>

REFERENCES

- International Food Policy Research Institute. Global Nutrition Report: From promise to impact - ending malnutrition by 2030. Available: <https://www.ifpri.org/publication/global-nutrition-report-2016-promise-impact-ending-malnutrition-2030> [Accessed 10 Aug 2021].
- WHO. Malnutrition. Available: <https://www.who.int/news-room/fact-sheets/detail/malnutrition> [Accessed 10 Aug 2021].
- Black MM, Pérez-Escamilla R, Rao SF. Integrating nutrition and child development interventions: scientific basis, evidence of impact, and implementation considerations. *Adv Nutr* 2015;6:852–9.
- UN. Sustainable development goals. Available: <http://www.un.org/sustainabledevelopment/sustainable-development-goals/> [Accessed 10 Aug 2021].
- Madon S, Malecela MN, Mashoto K, *et al*. The role of community participation for sustainable integrated neglected tropical diseases and water, sanitation and hygiene intervention programs: a pilot project in Tanzania. *Soc Sci Med* 2018;202:28–37.
- Tanga international competence centre. ... Available: <https://ticc.org/> [Accessed 10 Aug 2021].
- WHO. Healthy diet. Available: <https://www.who.int/news-room/fact-sheets/detail/healthy-diet> [Accessed 10 Aug 2021].
- Mensah DO, Nunes AR, Bockarie T, *et al*. Meat, fruit, and vegetable consumption in sub-Saharan Africa: a systematic review and meta-regression analysis. *Nutr Rev* 2021;79:651–92.
- Ware M. Bananas: health benefits, facts, research. Available: <http://www.medicalnewstoday.com/articles/271157.php#Possible> [Accessed 10 Aug 2021].
- Antwi J, Ohemeng A, Boateng L, *et al*. Primary school-based nutrition education intervention on nutrition knowledge, attitude and practices among school-age children in Ghana. *Glob Health Promot* 2020;27:114–22.
- Aurino E, Wolf S, Tsinigo E. Household food insecurity and early childhood development: longitudinal evidence from Ghana. *PLoS One* 2020;15:e0230965.
- Gebru NW, Gebreyesus SH, Habtemariam E, *et al*. Caregivers' feeding practices in Ethiopia: association with caregiver and child characteristics. *J Nutr Sci* 2021;10:e21.
- Austgard K. Doing it the Gadamerian way--using philosophical hermeneutics as a methodological approach in nursing science. *Scand J Caring Sci* 2012;26:829–34.
- Debesay J, Näden D, Slettebø A. How do we close the hermeneutic circle? A Gadamerian approach to justification in interpretation in qualitative studies. *Nurs Inq* 2008;15:57–66.
- Polit DF, Beck CT. *Essentials of nursing research: appraising evidence for nursing practice*. Philadelphia: Wolters Kluwer Health, 2014.
- Index TBT. Tanzania Country Report, 2022. Available: <https://bti-project.org/en/reports/country-report/TZA> [Accessed 24 May 2022].
- National Bureau of Statistics T. Tanzania in figures, 2019. Available: https://www.nbs.go.tz/nbs/takwimu/references/Tanzania_in_Figures_2019.zip [Accessed 10 Sep 2020].
- Brinkmann S, Kvale S. *InterViews : learning the craft of qualitative research interviewing*. 3rd ed. Thousand Oaks: Calif: Sage, 2015.
- Francis JJ, Johnston M, Robertson C, *et al*. What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychol Health* 2010;25:1229–45.
- Ltd. QIP. *NVivo (version 11)*, 2015.
- Bere E, Hilsen M, Klepp K-I. Effect of the nationwide free school fruit scheme in Norway. *Br J Nutr* 2010;104:589–94.
- Ransley JK, Greenwood DC, Cade JE, *et al*. Does the school fruit and vegetable scheme improve children's diet? A non-randomised controlled trial. *J Epidemiol Community Health* 2007;61:699–703.
- Ministry of Health, Community Development G, Elderly and Children (MoHCDGEC) [Tanzania, Mainland], Ministry of Health (MoH) [Zanzibar], National Bureau of Statistics (NBS), Office of the Chief Government Statistician (OCGS). Tanzania demographic and health survey and malaria indicator survey (TDHS-MIS). Available: <https://dhsprogram.com/pubs/pdf/FR321/FR321.pdf> [Accessed 10 Aug 2021].

- 24 Ministry of Health CD, Gender, Elderly and Children (MoHCDGEC) [Tanzania Mainland], Ministry of Health (MoH) [Zanzibar], Tanzania Food and Nutrition Centre (TFNC), National Bureau of Statistics (NBS), Office of the Chief Government Statistician (OCGS) [Zanzibar] and UNICEF. Tanzania national nutrition survey 2018. Available: <https://www.unicef.org/tanzania/reports/tanzania-national-nutrition-survey-2018> [Accessed 20 Nov 2021].
- 25 Williams PA, Cates SC, Blitstein JL, *et al.* Evaluating the impact of six supplemental nutrition assistance program education interventions on children's At-Home diets. *Health Educ Behav* 2015;42:329–38.
- 26 Krishna A, Oh J, Lee J-koo, *et al.* Short-Term and long-term associations between household wealth and physical growth: a cross-comparative analysis of children from four low- and middle-income countries. *Glob Health Action* 2015;8:26523.
- 27 McCoy DC, Peet ED, Ezzati M, *et al.* Early childhood developmental status in low- and middle-income countries: national, regional, and global prevalence estimates using predictive modeling. *PLoS Med* 2016;13:e1002034–18.
- 28 Devereux S, Hochfeld T, Karriem A. School Feeding in South Africa: What we know, what we don't know, what we need to know, what we need to do". Available: <https://foodsecurity.ac.za/publications/school-feeding-in-south-africa-what-we-know-what-we-dont-know-what-we-need-to-know-what-we-need-to-do/> [Accessed 30 Nov 2021].
- 29 Brookie KL, Best GI, Conner TS. Intake of raw fruits and vegetables is associated with better mental health than intake of processed fruits and vegetables. *Front Psychol* 2018;9:487.
- 30 King KM, Ling J. Results of a 3-year, nutrition and physical activity intervention for children in rural, low-socioeconomic status elementary schools. *Health Educ Res* 2015;30:647–59.
- 31 Marshall AN, Markham C, Ranjit N, *et al.* Long-Term impact of a school-based nutrition intervention on home nutrition environment and family fruit and vegetable intake: a two-year follow-up study. *Prev Med Rep* 2020;20:101247.
- 32 Bere E, Veierød MB, Bjelland M, *et al.* Free school fruit--sustained effect 1 year later. *Health Educ Res* 2006;21:268–75.
- 33 Bere E, Veierød MB, Klepp K-I. The Norwegian school fruit programme: evaluating paid vs. no-cost subscriptions. *Prev Med* 2005;41:463–70.
- 34 Ismail MR, Seabrook JA, Gilliland JA. Outcome evaluation of fruits and vegetables distribution interventions in schools: a systematic review and meta-analysis. *Public Health Nutr* 2021;24:4693–705.
- 35 Ismail MR, Seabrook JA, Gilliland JA. Process evaluation of fruit and vegetables distribution interventions in school-based settings: a systematic review. *Prev Med Rep* 2021;21:101281.
- 36 Sharma N, Asaf A, Vaivada T, *et al.* Delivery strategies supporting school-age child health: a systematic review. *Pediatrics* 2022;149. doi:10.1542/peds.2021-053852L. [Epub ahead of print: 01 May 2022].
- 37 Xu YY, Sawadogo-Lewis T, King SE, *et al.* Integrating nutrition into the education sector in low- and middle-income countries: a framework for a win-win collaboration. *Matern Child Nutr* 2021;17:e13156.
- 38 Grantham-McGregor SM, Fernald LCH, Kagawa RMC, *et al.* Effects of integrated child development and nutrition interventions on child development and nutritional status. *Ann N Y Acad Sci* 2014;1308:11–32.
- 39 Clark H, Coll-Seck AM, Banerjee A, *et al.* A future for the world's children? A WHO–UNICEF–Lancet Commission. *The Lancet* 2020;395:605–58.
- 40 Kapborga I, Berterö C. Using an interpreter in qualitative interviews: does it threaten validity? *Nurs Inq* 2002;9:52–6.