Co-creation of an Acceptable Indigenous Food Diet for Children Under Five in Early Childhood Development Centres

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Research

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Abstract

Background: The use of indigenous food (IF) such as green leafy vegetables and fruits in rural communities has been the main source of food despite being replaced by food high in sugar and fats. Early Childhood Development (ECD) centres are uniquely positioned for positive influence to healthy eating of children. The aim of this study was for ECD stakeholders to co-create an IF diet for children under five in ECD centres.

Method: A sequential explanatory mixed method design was employed. We conducted focus group discussion with stakeholders employing the community-based participatory research (CBPR) approach and the nominal group technique ranking method to co-create to an acceptable indigenous food diet for children. Data was analyzed using both qualitative and quantitative methods. A thematic approach to qualitative data analysis with a coding framework guided by Consolidated Framework for Implementation Research (intervention characteristics, inner setting, outer setting, characteristics of individuals involved in implementation and the implementation process) was employed to analyse focus group discussion data. Statistical analysis was employed to analyze quantitative data collected through surveys.

Results: Study participants included ECD stakeholders (ECD managers, social workers and dieticians) aged 34-52. Participants identified Ditokomane, Oranges, Mabele soft porridge, Dithotse and Dinawa as components of an IF that are suitable and acceptable for children under five years in ECD centres.

Conclusion: ECD stakeholders co-created an IF diet to be implemented in ECD centres for children under five. Stakeholders are of the view that IF diet will have more health benefits on children than the current menu that is being used.

Background

Indigenous people have long relied on indigenous food (IF) as part of their diet as they are nutritionally, culturally and economically important for health (1). In rural areas, multiple nutritional benefits of IF have been reported mainly because they grow naturally and are readily available, accessible and inexpensive (2, 3). They are rich in nutritional qualities and they supplement food and nutritional security (3). Furthermore, they contribute to more than 50% of vitamin A and zinc in children's overall diet (4). According to the Nutrition Guidelines for Early Childhood Development (NGECD) ,early childhood development (ECD) is a good time for children to learn basic healthy eating(5). However, poor nutrition, poverty and lack of access to basic survival threaten the full potential development of over 43% of children under five according to United nation children's fund (UNICEF)(6). Moreover, poor nutrition, delayed early stimulation and learning opportunities result in lowered cognitive, language and psychosocial outcomes of children (5). South African paediatric food-based guidelines recommend a balanced diet that is adequate, meets nutritional requirements and lowers risk of non-communicable diseases (6).

ECD centres provide a useful mechanism for delivery of nutrition in poor communities (7). The Children's Act No.38 of 2005 obliged ECD centres to ensure provision of daily nutritious meals to children. Optimal nutrition during childhood is critical to ensure optimal health, growth and development as documented in the NGECD(8). Menu planning, providing nutritious meals and establishing food gardens in line with Food Based Dietary Guidelines (FBDG) is essential for nutritious and developmental outcomes (6). In line with the FBDG, different colored, textured IF food should be frequently offered to preschool children (6). However, a gap exists in the absence of policies that explicitly promote the use of locally available IF (9).

Despite the availability of IF, consumption frequency in rural areas is currently very low and declining (3). Many factors have been reported to affect consumption of IF in general with several underutilized IF reported despite being a sustainable and nutritious source of food (3, 10). Availability, preparation, role modelling and nutritious knowledge of caregivers were identified as some of the barriers to healthy diet (10). This has prompted the Western Cape initiative to train ECD practitioners on developing affordable nutritious meals, preparation and establishment of food gardens (7). Poor knowledge of nutritional benefits of IF and the growing disinterest of the younger generation for this food contribute to their being underutilized (11). In addition, urbanization, collapse of knowledge on preparation and conservation skills, contribute towards their underutilization (12). Decline in agricultural activities, community and household food gardens threatens both the availability and access of IF for a healthy diet (13).

The Department of Social Development policy of food subsidy was developed to ensure access and availability of food in ECD centres (4). However, their focus is on quantity with little attention given on ensuring dietary diversity and quality(4). In South Africa, the national food and nutrition security policy advocates for consumption of nutrients-dense underutilized IF as a promotion strategy (10). To this far, little has been reported on the interventions to promote the success of the intervention and other new promotional interventions on the use of IF diet amongst children in ECD centers. As a follow up study from an unpublished manuscript on the knowledge, availability and use of IF in ECD centres, our study aims to co-create an acceptable IF diet to be implemented in ECD centres as an intervention to promote IF use. It is anticipated that the findings of this study will help guide ECD policy makers on the most appropriate multi-sectoral approach for promoting implementing IF diet interventions for children ECD centres in rural South Africa.

Methodology

Study design

We used community based participatory research (CBPR) approach to co-create the IF diet in the rural Limpopo province. Focus group discussions (FGD) was employed followed by a survey and expert review on the diet with Nominal group technique (NGT) employed for ranking on votes. The use of CBPR approach has helped in identifying the needs of the community to address eating behaviors through an IF diet and identify available resources that can be used to co-create the IF diet and promote the use.

Setting

The study was conducted in Fetakgomo-Tubatse municipality, Sekhukhune district, Limpopo province. Sekhukhune is one of the five districts in Limpopo with 53% of severely food insecure households. Fetakgomo-Tubatse is one of the four municipalities in the Sekhukhune district and is the biggest, it accounts for 42% of the geographic area with villages scattered throughout with over 2200 indigenous species. This area has limited access to running water and experiences low rainfall throughout the year. Our previous study reveals the following IF (dinawa, lerotho, leotja, thepe. magaba) which are locally available and can be accessed easily during rainy and some in dry season.

Population

The study population included stakeholders who are responsible for running ECD centres and involved in the development and monitoring of the menu. For the purpose of this study stakeholders were categorized into ECD manager, social workers and a dietician.

Sampling

Convenient sampling was used to select 6 stakeholders working with 3 funded ECD centres within the Fetakgomo-Tubase municipality. All stakeholders gave consent to be part of the study and were included. All selected stakeholders participated in the co-creation of an acceptable IF diet for children and further completed the surveys to calculate their level of agreement on the co-created IF diet.

Data collection

Sequential explanatory mixed method design was employed for data collection. We collected qualitative and quantitative data from ECD stakeholders through FGD guided by a designed interview tool and a questionnaire with pre-populated list of IF types. This was followed by expert review of the proposed IF diet co-created. The questionnaire addressed the sociodemographic characteristics of stakeholders (gender, age, years of working experience and level of education). Nominal group technique(NGT) stage four of ranking the votes was employed (14). Stakeholders ranked the IF prioritized for co-creation of an IF diet, ranking was done from highest to lowest priority on a scale of 5 – 1, number of votes per IF was calculated to get the percentage.

Planning the meeting

We held a planning meeting with the research team and the stakeholders. We outlined the purpose of the planning meeting to attendees. The planning meeting addressed the aim of the research and the entire data collection process. Following obtaining informed consent from participants, the CBPR approach was explained to equip participants with knowledge of the CBPR approach. FGD and survey methods which were used for the co-creation of IF diet for children were outlined. Participants were given time to seek clarity and make suggestions.

Focus group discussion

FGD was used with the aim of collecting qualitative data from the stakeholders as participants following the CBPR approach. An interview guide was designed following the review of some findings of our

previous study on knowledge and use of available IF in the same setting. The series of questions including their knowledge on the current use of IF, strategies that can be used to improve the use of IF among children, proper feeding practices for children under five, challenges and limitations hindering the use of IF to co-create acceptable IF diet implementation by children in selected ECD centres. The focus group was moderated by one of the stakeholders and conducted in Sepedi which is the local language and lasted for no more than 60 minutes. The first author (GN) took notes and the discussion was audio taped. Findings of the focus group informed the design of the questionnaire.

Questionnaire

Quantitatively, a questionnaire with close-ended questions with pre-populated list of IF's was administered to stakeholders to calculate the number of food items to be included in the IF diet. The pre-populated IF's were obtained from the previous study we conducted and from the focus group where stakeholders listed the different IF types on the basis of favorability amongst the children, accessibility, acceptability and availability. The survey was completed individually.

Experts review

Data collection was concluded by employing one of the CBPR principles of promoting collaborative and equitable partnership through recognizing knowledge and expertise of participants. Experts involving dietician, social workers and ECD managers reviewed the list of IF voted for to co-create an IF diet that is suitable and acceptable for children under five.

Data analysis

The tape-recorded focus group discussion was transcribed verbatim in Microsoft word 2018. Verbatim transcripts of the discussion with stakeholders were performed to ensure validity of the interviews. Interviews were uploaded into NVIVO 12 software for analysis. A thematic approach to qualitative data analysis with a coding framework guided by Consolidated Framework for Implementation Research (intervention characteristics, inner setting, outer setting, characteristics of individuals involved in implementation and the implementation process) was employed to analyse focus group discussion data. A framework-based thematic analysis was performed by GN and TD in parallel guided by Consolidated Framework for Implementation Research (CFIR) (15). CFIR approach allows for identification of major domains affecting the implementation of the intervention (16, 17).

Qualitative data was analyzed using an inductive coding technique. A coding frame was derived from the CFIR framework with codes relating to IF availability, use, and acceptability. Hybrid approach was employed to allow incorporation of different sets of themes that came from the interview against the CFIR and other sets emerged from the transcripts (18). Focus group transcripts were reviewed line by line using basic thematic approach.

Quantitative questionnaire data was collated in a spreadsheet to analyze the level of agreement of stakeholders on the IF types to be included in the IF diet. Descriptive data analysis was carried out to

obtain the association between dependent and independent variables. The t-test was used to determine the variances between variables. In addition, 95% CI estimates were used to examine associations.

NGT ranking process was employed to analyze quantitative data from the participants. Ranking their ideas from a scale of 1–5 was done through allocating votes to each idea. The overall priority score for each theme was then calculated. This was done through capturing ranking responses and calculating overall priority scores.

Sequential exploratory mixed method data was integrated. Coded focus group data and quantitative data were organized into a framework. We adapted a case and theme-based approach in order to manage our data through summarization and synthesis. Codes documents were constructed systematically and integrated relevant data under each code to accommodate both focus group transcripts and statistical data for analyses. Key themes were identified and collated to gain integrated conclusions from our mixed method study.

Results

Characteristics of study participants

In total the FGD comprised six participants from 34–52. The attendance rate was 66.6% since nine participants were expected. Reasons for non-attendance include work commitment and urgent family responsibility. Characteristics of the participants are outlined in Table 1.

Table 1
Presentation of participants by age, gender, level of education and years of working experience in working with ECD centres.

Participant ID#	Age	Gender	Level of education	Years of working experience
01	34	M	Postgraduate	7
02	52	F	Diploma	22
03	45	F	Diploma	15
04	48	F	Diploma	15
05	38	M	Postgraduate	10
06	36	F	Postgraduate	7

Focus group discussion

Stakeholders in the focus group discussion expressed positive attitudes towards the IF diet for children in ECD centers. CFIR domains on intervention characteristics – intervention source, evidence strength and quality, relative advantage, adaptability, trialability, complexity, design quality and packaging and cost

were thematic issues from the framework analysis of interview data. Table 2 presents framework analysis of the FGD transcript using the Consolidated framework for implementation research.

Table 2
Framework analysis of the FGD transcript using the Consolidated framework for implementation research.

Intervention Characteristics
a) **Intervention source:** Stakeholders shared their views on the current diet of children and knowledge on types of IF they perceived are suitable, accessible and available and should be included in the diet and address the poor eating habits. Stakeholders also identified the need for parents to be involved. *"Children are not fed properly the way they should be, the food that are being introduced are not good for their growth and development and don't include fruits and vegetable"* *"Dinawa being grown from the gardens"* *"Sweet potato can be included as part of food, potatoes, beetroot, leaves of sweet potatoes"* *"To add to the list, peanuts can be favorable either dried or boiled"* *''The good strategy is to limit the amount of food, some kids have big stomach and we think they are healthy, kids need to be taught how to eat/eating behavior as they don't differentiate, they just want to eat what is available"* *''Parents should be fully involved to assist the children healthy eating"*
b) **Evidence Strength and Quality**: Stakeholders shared their knowledge on the preparation of IF for improved children's health and development. Stakeholders are of the perception that some IF can be cooked alone and some can be mixed together to make one dish. *" cooking styles makes food more favorable"* *''Dithlodi mixed with maize and make semothwane, they are small nice things we can cook as if its porridge and eat"* *''lerotse, we can do jam and spread on bread, they are always available depending on water"* *"Is like we can go back to the times of our grandparents, they were never sick, they ate food fresh from the ground, maize meal was processed from home without any chemical unlike now. I think the use of this food can contribute to the decline in diseases"*
c) **Relative advantage**: Stakeholders' perceived the IF diet to have a relative advantage over the current feeding practices currently implemented in ECD centers. *"The menu used in ECD centers should really need change and food should be strictly nutritious with inclusion of fruits and vegetables daily"* *"Good feeding practices involve teaching children quality of food than quantity as parents are interested in giving them more food "* *"Fatty foods must be avoided at all times"* *''Children should not eat IF only at school they must also eat at home so that they can develop well"*
d) **Adaptability**: The stakeholders were of the perception that the IF diet would be fairly adaptable to meet children's needs at the ECD centers. Stakeholders highlighted the need for self-motivated actions that were attainable with as little effort as a center starting up a garden as a source for important diet constituents. *"I support the idea, lets change the menu, we must go back to the indigenous food diet, eat food like dikgobe, kgodu and homemade mageu"*

"We need to have gardens where we can grow our own food such as dinawa, spinach, this can help children to even see food from the soil before they are prepared, they can eat them in different ways. They will also know them from the soil not shops"

e) **Trialability:** Stakeholders expressed the need for early introduction of IF and selection of IF suitable for the children's health and development.

"Availability and accessibility of other IF may can be a problem"

'*'Involves the introduction of food that is in line with the age of the children and food that will benefit their health outcomes and good development"*

'*'Fatty foods must be avoided at all times"*

f) **Complexity**: Stakeholders expressed concern on some logistical challenges that may need to be overcome for successful implementation of the IF diet. Water scarcity emerged as one of those challenges. Further, stakeholders expressed the need to have parents fully on board with the program to ensure success.

"Water scarcity, parents not wanting their children to be fed"

"food is not treating their kids well. Parents should be fully involved to assist the children healthy eating."

"Children must be able to see this food, if we say this is pumpkin, vegetables they must see them so that they can know them. Now we are buying them such as spinach due to water shortage. The knowledge of IF has disappeared."

g) **Design Quality and Packaging:** Stakeholders expressed the need to consider the quality of food than quantity as a good feeding practice for children. Early introduction of IF continue to adulthood.

'*'Good feeding practice involves teaching children quality of food rather than quantity as parents are interested in feeding them more food"*

"We must change the introduction of genetically modified food from early age and give them proper nutritious food such as fruits and vegetables"

'*'For better health on children, the other method is to reduce the fatty foods, children start eating fatty foods from early childhood and continue to their adulthood, at the end they have diseases so we must avoid them"*

'*'We must teach children to eat fruits and vegetables at the ECD centres because they spend more time there*"

"IF makes people healthy, food of these days is no longer fresh due to injections"

h) **Cost**: Costs of the IF in the diet was raised as an important barrier to sustainability of the IF diet. Stakeholders raised concerns over other centers not being able to meet the costs of the requisite food products

"Other ECD centers may not follow the menu regularly if they fail to access the food, some may not have money to purchase them"

Ranking of priorities

Stakeholders identified a list of 16 IF types to be included in the IF diet. Ranking was done from highest to the lowest priority using the rating score of 5 – 1. In this context priority refers to the food that have been voted most important for inclusion in the diet. Ditokomane, Oranges and Mabele soft porridge scored the highest rating, porridge, mochaina and lerotse scored the lowest ratings. The ranking results are presented in the Table 2.

Table 2
Ranking results in descending order

Types of IF	Votes scores					Percentage of votes
	5	4	3	2	1	
Ditokomane	6	0	0	0	0	38
Orange	6	0	0	0	0	38
Mabele soft porridge	5	1	0	0	0	36
Dithotse	4	2	0	0	0	35
Dinawa	4	2	0	0	0	35
Banana	4	2	0	0	0	35
Sweet potatoes	4	2	0	0	0	35
Spinach	4	1	1	0	0	34
Beetroot	4	1	1	0	0	34
Kgodu	3	2	1	0	0	26
Samp	3	2	1	0	0	26
Magaba	2	3	0	1	0	24
Semperiane	3	1	1	1	0	24
Porridge	3	1	1	0	1	23
Lerotse	0	2	2	3	0	20
Mochaina	1	1	2	2	0	19

Co-created IF diet

Experts used prioritized IF to develop co-create an IF diet menu for children. The following factors were considered prior to finalization: the frequency of use for each IF type, suggested type of meal and preparation method. Experts review is summarized in Table 3.

Table 3
IF diet menu for children

IF	Frequency of use in a week	Type of meal	Preparation and serving
Ditokomane	Twice a week	Lunch Afternoon Snack	Cooked mixed with samp Fried
Orange	Three times a week	Snack	Raw
Mabele soft porridge	Three times a week	Breakfast	Cooked and served with milk
Dithotse	Once a week	Afternoon snack	Dried and serve
Dinawa	Twice a week	Lunch	Cooked alone or mixed with samp
Banana	Once a week	Snack	Raw
Sweet potatoes	Twice a week	Break fast Afternoon snack	Mashed with milk Boil and serve
Spinach	Once a week	Lunch	Boiled with carrots served with porridge
Beetroot	Once a week	Lunch	Boiled served with samp
Kgodu	Once a week	Lunch	Cooked and served alone
Samp	Once a week	Lunch	Cooked mixed with beans

Discussion

This study presents the results of a co-creation of an IF diet for children under five in ECD centres. Stakeholders shared their knowledge and perceptions of IF types to co-created an IF diet to be implemented in ECD centers. Experts perceived it suitable to address poor eating habits to improve health and nutritional outcomes of children. This diet will help achieve SGD 3 and 4 that seek to promote improved nutrition and ensuring healthy lifestyles for all ages (19). A menu was designed with fruits, vegetables and mixed dishes in line with the South African FBDG (6). Our findings reveal that stakeholders perceived an IF diet as essential in achieving 2030 agenda to end malnutrition, stunting and wasting for children under five. Stakeholders shared pre-populated types of IF suitable and acceptable for use by children under five.

An IF diet menu was co-created with consideration of important factors such as frequency of use for the prioritized IF, the type of meal, how they should be prepared and served. Furthermore, stakeholders co-created the IF diet with the types of food that are suitable and acceptable for consumption for children

under five. IF such as ditokomane, oranges, mabele soft porridge, dinawa were prioritized for inclusion in the menu. The prioritized food to be served not less than twice a week whereas the least prioritized food can be served once a week. Stakeholders expressed the need to consider IF preparation, the quality of IF and the feeding practices during implementation of the diet.

In our study, stakeholders perceived the use of an IF diet as a strategy to address poor eating habits at an early age. This is backed by a report on IF and their contribution to nutritional requirements which states that IF play a major role in enhancing quality diets (20). Stakeholders perceived that IF can be cooked alone and some mixed to made one dish. This findings support a previous study which highlights that combination of fruits and vegetables have more potential benefits rather than single fruits and vegetable (21). Furthermore, sufficient intake of fruits and vegetables has been related with reduced risk of many non-communicable diseases (21). Challenges were reported that may affect implementation of IF diet were reported elsewhere (4, 22). Similar challenges were reported from a study conducted on the role of fruits and vegetable in delivering healthy diets challenges on accessibility and acceptability of IF (22). Stakeholders expressed the need for early introduction of IF diet for children's health and development. However, a study conducted on rural parent support on child health behavior reveal that children are being fed food that does not support their growing bodies and brains (23). Early exposure to overall unhealthy diets low in nutrients dense food negatively impact children's cognitive development (24).

An IF diet was co-created by stakeholders and reviewed by experts to ensure that it is suitable and acceptable for use by children under five. Stakeholders perceive the IF diet as an initiative to promote healthy eating, barriers that emerges to impede the implementation of the diet need to be addressed. The current co-created diet includes fruits, vegetables and mixed dishes, this correlates well with the findings of the previous study conducted on consumption intensity of leafy indigenous vegetables which reports that diversity in IF consumption is necessary for healthy diet(8). In addition, FBDG recommends that different colored, textured, and tasting fruits and vegetables, both fresh and cooked should be frequently offered to children(6). Stakeholders emphasized the frequent consumption of both fruits and vegetables such as oranges, banana, spinach and beetroot on daily basis. Okop,2019 reports that adequate intake of fruits and vegetables is considered an essential for optimum growth(25). However, in the current study amounts of IF to be consumed were not indicated. This is contrary to the study by Ramsay, 2017 which reports that children should be fed specific amounts of fruits and vegetables to optimize growth(26).

Nutrition interventions targeting ECD centres need to be strengthened to promote and encourage early introduction of an IF diet as part of healthy eating for improved nutritional outcomes. Future studies should focus on nutritional values of IF to ensure that the diet address the nutritional status of children under five. Government should strengthen collaborations to ensure accessibility, acceptability and affordability in ECD centres.

The strength of this study is that all stakeholders involved in the co-creation of an IF diet work with ECD centres and children under five. The participants comprised of different age groups and gender shared different perceptions regarding the diet which is suitable and acceptable for children under five.

Limitation of this study was that only stakeholders from other settings limiting knowledge and expertise from other settings towards the study findings. There is a need for further research with stakeholders from different settings were there are different types of IF available and preferred for children under five.

Conclusion

The current findings demonstrated knowledge and expertise of stakeholders on co-creation of an IF diet for children under five. Frequent use of different types of IF is essential for optimum health and growth of children. Parents should be equipped with nutrition education to promote the early introduction and implementation of an IF diet both at ECD and at home.

Declarations

Consent for publication

Not applicable

Availability of data and material

No supplementary material available

Competing interest

The authors declare that there is no competing interest in this section.

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Authors contribution

G.N and T.P.M-T conceptualized the study. GN T.D carried out the first analysis. GN produced the first draft of the manuscript. T.P.M-T reviewed the draft and contributed to the last version. All authors have read and agreed to the published version of the manuscript.

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