

Compliance to Complementary Feeding Guidelines in a Tertiary Hospital in Nairobi, Kenya

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Abstract

Background:

Appropriate complementary feeding is a practice with great potential for reduction of nutrition-related diseases and mortalities in children. However, uptake of the recommended World Health Organisation (WHO) infant and young child feeding practices in Kenya remains low. Most previous studies have been done in rural or urban poor populations hence the need to provide practical guidelines for the complementary feeding period in a typical middle-class urban setting.

This study investigated complementary feeding practices by caregivers of infants and young children on follow up at Aga Khan University Hospital-Nairobi (AKUH-N) well-baby clinic and the factors influencing compliance with the WHO guidelines.

Methods:

A total of 290 caregivers of infants and young children aged between nine and twenty-four months were interviewed using a questionnaire. This questionnaire was adapted from that provided in the WHO Indicators for assessing Infant and Young Child Feeding Practices measurements booklet (1). Out of 290 participants, 21 were purposively sampled to participate in a qualitative study using in-depth interviews. Thematic analysis was used to analyse qualitative data while descriptive statistics, univariate and multivariate regression analysis were used for quantitative data. A convergent parallel design was used to integrate the qualitative and quantitative data.

Results:

Out of 290 caregivers interviewed, 125 (43.1%) complied with WHO complementary feeding guidelines. Factors that significantly affected complementary feeding practices included education level of the caregiver, access to information, support from healthcare workers and fear of allergic reactions.

Conclusions:

Full compliance to WHO complementary feeding guidelines remained below 50%. Some of the factors positively associated with compliance with complementary feeding guidelines included access to multiple sources of information, and support from health workers and family members. Lack of tertiary education of the caregiver, absence of specific and practical guidelines, resource constraints and fear of allergies were found to negatively impact compliance with complementary feeding guidelines.

Background

Nutrition, is of great importance in the health and well-being of a child, especially in the period from conception to the age of two years. Malnutrition not only causes death in millions of children, but also leaves many more with lifelong physical and mental impairments (2). The Lancet series, published in

2008, demonstrated a strong link between maternal and child under-nutrition and adult short stature, poor school attendance, and a heightened risk for chronic diseases as adults as well as a decline in economic potential(3). In-utero, the growing fetus is completely dependent on the mother for its nutrition. From birth to about six months of age, adequate intake of breast milk meets the nutritional requirements for full term infants. Thereafter, complementary feeds are needed in order to meet the nutritional and developmental needs of the growing infant. World Health Organization (WHO) defines appropriate complementary feeding as: timely, adequate, safe and properly fed.

Worldwide, low compliance with these recommendations is evident (4). It is concerning that complementary feeds are either introduced too early or too late and even then, they are often not of the appropriate quality or quantity. Adequacy of feeds is guided by the WHO definition of minimum acceptable diet, which requires that both minimum meal frequency and minimum diet diversity be met (1). Minimum meal frequency is defined as "two times per day for breastfed infants aged six to eight months, three times for breastfed children aged nine to twenty-four months and four times for non-breastfed children aged six to twenty-four months." This indicator is intended as a surrogate for energy intake from foods other than breast milk (5).

Minimum Diet Diversity is a diet consisting of foods from four or more of the following food groups: grains, roots and tubers; legumes and nuts; dairy products (milk, yogurt, fermented milk); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin-A rich-fruits and vegetables; other fruits and vegetables(5).

The core indicators that need to be met for compliance are as follows: timely introduction of complementary feeds (at 6 months), adequacy of feeds (meeting both the minimum frequency and minimum diet diversity), inclusion of iron-rich foods in the diet and continued breastfeeding on demand until at least two years of age (1).

The latest Kenya Demographic and Health Survey (KDHS) statistics indicate that only 22% of children are fed in accordance with the WHO-recommended infant and young child feeding practices (6). The KDHS statistic is averaged over the entire country and has limited practical policy and guideline utility in a local setting, since it may mask wide variations across different geographies and populations. Most studies in Kenya have focused on infants attending clinics at public facilities (7–9). They found that low socioeconomic status as well as lack of provision of nutrition education were barriers to proper complementary feeding practices.

Nutrition education, which has been shown to improve complementary feeding practice, is done regularly by the paediatricians and nurses at the Aga Khan University Hospital-Nairobi (AKUH-N) well-baby clinics. Despite this, trends towards growth-faltering and over-weight have been observed, pointing to both under- and over-nutrition. A retrospective chart review of 48 infants seen at the well-baby clinic revealed that 21 (44%) of the infants had weight-for-age growth-faltering while 3 (6%) were overweight.

Whereas other studies have focused on rural or socio-economically disadvantaged populations, AKUH-N offers a unique opportunity for exploration of other factors and gaps for intervention relevant in an urban cosmopolitan middle-class population.

Methods

The study was carried out at the AKUH-N well-baby clinic which provides growth and development monitoring of children of up to two years. It also provides health education, including advice on proper complementary feeding methods, as well as vaccination services. The study targeted infants between nine and twenty-four months of age who were on follow-up at this clinic, and their primary caregivers- that is their parents and/ or legal guardians.

This was a mixed-methods cross-sectional study that combined both quantitative and qualitative methods in a convergent parallel design.

Quantitative sample size calculation was based on the national rate of compliance to WHO guidelines reported at 22% (6). Two hundred and ninety respondents were recruited for the quantitative arm of the study. A questionnaire was used to measure knowledge, attitude and practice of complementary feeding against the WHO set standards (10).

Data Collection

Three interviewers were trained on how the tools were developed, how to approach respondents, how to administer the questionnaires and check data. The questionnaire was piloted among 10 respondents who were not included in the study to check for clarity, flow and ease of administration of the questions. No revisions were found necessary after piloting. Following written informed consent, the questionnaire was administered to the caregivers in an interview that took approximately 15 minutes. The principal investigator (CMN) supervised this process to ensure that the questionnaires were properly administered. Data were collected from March to December 2018.

All infants whose caregivers responded to the questionnaire had their growth parameters plotted in standard WHO weight-for-age, length-for-age and weight-for-height growth charts. Infants who were of appropriate weight, overweight, underweight/those with growth-faltering were then identified.

An interview guide (Supplementary File II) which consisted of 13 sections with a total of 30 questions was used to collect qualitative data. It assessed predisposing, enabling and reinforcing factors affecting compliance with WHO guidelines for complementary feeding. This was based on the PRECEDE model by Green and Kreuter (11)-a community oriented participatory model for investigating factors affecting health promoting behaviour.

The first seven caregivers in each category whose infants were classified as appropriate weight, overweight or under-weight/having growth-faltering, were purposively selected and invited to participate in In-

Depth Interviews (IDIs). In total, 21 IDIs were conducted among the caregivers. The interviews were scheduled depending on the caregiver's convenience and were conducted in English by the principal investigator. Each interview lasted approximately 60 minutes and was audio-recorded. In addition, field notes were taken. The sample size was guided by the principle of saturation, that is, the point at which collection of new data does not yield any new information. Data were collected from September to December 2018.

Quantitative Data Analysis

Quantitative data were analysed using the Statistical Package for Social Sciences (SPSS) version 21.0. Proportions were estimated for categorical outcomes describing the knowledge and practice of caregivers as measured against WHO guidelines. Caregivers who scored 0–10 were considered as having poor knowledge on complementary feeding. Those who scored 11–15 were considered to have average knowledge while caregivers who scored 16–20 demonstrated good knowledge on complementary feeding practices. In the analysis of the complementary feeding practices, all the aforesaid core indicators had to be met for a caregiver to be considered compliant with the WHO guidelines. The variable was then categorized in binary form (yes or no).

Factors affecting compliance with WHO guidelines such as socio-demographic characteristics were analysed by descriptive statistics. Continuous data were summarized as mean or median scores. Chi-square test was used to investigate the relationship between predisposing, enabling and reinforcing factors and complementary feeding practices. Four variables were found to have a significant relationship with complementary feeding practices in the univariate analyses ($p < 0.25$). These were retained in the multivariate logistic regression model building process to predict compliance to complimentary feeding guidelines ($p < 0.05$).

Qualitative Data Analysis

Qualitative data were audio-recorded and transcribed verbatim. Data were then analyzed using thematic framework analysis, as described by Ritchie and Spencer (12).

The principal investigator organized data from the original transcripts into charts with headings and sub-headings derived from the constructed thematic framework. After charting the data according to the main themes, it was mapped and interpreted as a whole. The researcher reviewed the charts and research notes, comparing and contrasting the thoughts and experiences of different respondents. The mixed nature of this study i.e. quantitative and qualitative, allowed enhancement of the study's internal validity via triangulation. This was applied to predisposing factors such as: culture, religion and gender of the child which were assessed using both the questionnaire (quantitative) and the interview guide (qualitative). The consistency of evidence from the two sources, as opposed to reliance on a single source, was used to strengthen the interpretations made. Triangulation also helped to reduce researcher bias since findings were substantiated by data from multiple sources. Two members of the research team (CMN and CKM) independently coded the transcripts and generated themes. Any disagreement on

codes and emerging themes was resolved through discussion. This process served to maximize the rigor and validity of the analysis.

Results

Characteristics of the Study Population

A total of 343 caregivers participated in the study. Twenty three (6.7%) did not meet inclusion criteria and 30 (8.8%) declined to participate. The remaining 290 (84.5%) were interviewed. The demographic characteristics of the caregivers and their infants are shown in Table 3.1

Table 3.1
 Characteristics of infants, young
 children and their caregivers

| Variable | Frequency (%) |
|-------------------|----------------------|
| Sex | |
| Male | 147 (50.7) |
| Female | 143 (49.3) |
| Age | |
| 9–12 months | 188 (64.8) |
| 13–24 months | 102 (35.2) |
| Sex of caregivers | |
| Female | 286 (98.6) |
| Male | 4 (1.4) |
| Religion | |
| Christian | 264 (91.1) |
| Islam | 16 (5.5) |
| None | 1 (0.3) |
| Other | 9 (3.1) |
| Education Level | |
| None | 2 (7) |
| Primary | 2 (7) |
| Secondary | 12 (4.1) |
| College | 48 (16.6) |
| University | 226 (77.9) |
| Occupation | |
| Housewife | 22 (7.6) |
| Business | 66 (22.8) |
| Professional | 194 (66.9) |
| Student | 5 (1.7) |
| Other | 3 (1) |

| Variable | Frequency (%) |
|----------------|---------------|
| Marital Status | |
| Single | 13 (4.5) |
| Married | 275 (94.8) |
| Separated | 1 (0.3) |
| Widowed | 1 (0.3) |

Compliance with WHO Complementary Feeding Guidelines

The rates of compliance with different aspects of the WHO complementary feeding guidelines are tabulated in Table 3.2

Table 3.2
Compliance with WHO Complementary Feeding Guidelines

| Variable | Frequency (%) |
|---------------------------------------|---------------|
| Introduction of Complementary Feeding | |
| Before 6 months | 40 (13.8) |
| At 6 months | 223 (76.9) |
| After 6 months | 27 (9.3) |
| Iron Rich food/supplement | |
| Yes | 235 (81) |
| No | 55 (19) |
| Continued BF 6–24 months | |
| Yes | 215 (74.1) |
| No | 75 (25.9) |
| Reasons BF stopped | |
| Not enough milk | 24 (32.4) |
| Went back to work | 3 (4.1) |
| Child uninterested | 33 (44.6) |
| Never Breastfed | 1 (1.4) |
| Other | 13 (17.6) |
| Minimum Meal Diversity | |
| Met | 266 (91.7) |
| Not Met | 24 (8.3) |
| Minimum Meal Frequency | |
| Met | 276 (95.2) |
| Not Met | 14 (4.8) |
| Compliant with WHO Guidelines | |
| Compliant | 125 (43.1) |
| Non Compliant | 165 (56.9) |

Nutritional Status of the Infants and Young Children

Although this study was not powered to investigate the nutritional status, this was reported as a secondary outcome. Twenty (6.9%) of the infants and young children were underweight, five (1.7%) stunted and 25(8.6%) overweight. A comparison with the national average rates is displayed in Fig. 3.1

3.4 Factors Affecting Compliance with WHO Complementary Feeding Guidelines

Eight variables were studied as potential predictors of compliance. Of these, four had univariate p-values < 0.25. These were the child's age and sex as well as the caregiver's age and education level. In multiple logistic regression analysis, the child's age was associated with compliance, and caregivers of children aged 9–12 months were more likely to be compliant relative to those with older children ($p < 0.001$). Caregivers with lower level of education (below college level) had a significantly reduced odds of compliance ($P = 0.04$) (Table 3.3).

Table 3.3
Factors associated with compliance with WHO Complementary Feeding Guidelines

| VARIABLE | UNIVARIATE ANALYSIS | | MULTIVARIATE ANALYSIS | |
|------------------------------------|---------------------|---------|-----------------------|-------------|
| | Crude OR (95% CI) | p-value | Adjusted OR (95% CI) | p-value |
| Child's Age | 1 | < 0.001 | 1 | < 0.001 |
| 13–24 months | 3.3 (1.9–5.5) | | 3.4 (2.0- 5.9) | |
| 9–12 months | | | | |
| Caregiver's Age | 1 | 0.22 | 1 | 0.22 |
| 30 and Above | 1.4 (0.8–2.2) | | 1.4 (0.8–2.5) | |
| Below 30 | | | | |
| No. of children | 1 | 0.93 | N/A | N/A |
| More than 1 Child | 1.0 (0.6–1.6) | | | |
| 1 Child | | | | |
| Child's Sex | 1 | 0.07 | 1 | 0.07 |
| Male | 0.7 (0.4- 1.0) | | 0.7 (0.4–1.1) | |
| Female | | | | |
| Attitude towards EBF | 1 | 0.34 | N/A | N/A |
| Positive Attitude | 0.8 (0.4–1.4) | | | |
| Negative Attitude | | | | |
| Caregiver's Occupation | 1 | 0.73 | N/A | N/A |
| Professional | 0.9 (0.6–1.5) | | | |
| Others | | | | |
| Caregiver's Education Level | 1 | 0.06 | 1 | 0.04 |
| College Level & above | 0.3 (0.1- 1.0) | | 0.2 (0.05–0.8) | |
| Below College Level | | | | |
| Caregiver's Knowledge Score | 1 | 0.51 | N/A | N/A |
| High | 0.9 (0.5–1.4) | | | |
| Average | | | | |

The findings from the qualitative arm were analysed and grouped into six different themes: religious and cultural beliefs, knowledge of complementary feeding (CF) guidelines, access to information or

guidelines, resource constraints, support from health care workers and family, and fear of allergies. The respondents (R) were given identifiers based on the order in which they were interviewed and the nutritional status of the child, that is, underweight (UW), average weight (AW) or overweight (OW). Some of the direct responses from the participants have been categorised and presented in a table in Supplementary file III.

Respondents knew of cultural and religious restrictions, but did not apply them to their complementary feeding practices. In terms of knowledge of complementary feeding guidelines, caregivers seemed to have broad concepts on the feeding guidelines, but lacked clarity in specific and practical aspects. Concerning access to guidelines, respondents indicated that multiple sources of information were available to most care givers, including family members, the paediatrician and the internet. Another emergent theme was lack of resources, both money and time, which limited the kind of feeds offered, participation in preparing the meals, and clinic visits. Support from health care workers and family members was also noted to be an important contributor towards compliance to guidelines. Finally, fear of allergies emerged as a deterrent factor. Certain foods, notably animal proteins, were either delayed or avoided by caregivers due to fear of allergic reactions. This theme was frequent among caregivers with underweight infants.

Discussion

The overall level of compliance with the WHO guidelines for complementary feeding was higher than that reported nationally (6). This was possibly due to the fact that the study was based in a tertiary level hospital in a middle-class urban area. The KDHS 2014 (6) indeed reported that children in rural areas were less likely to be fed appropriately than their urban counterparts. Regionally, caregivers in Nairobi had the highest rate of adherence to Infant and Young Child Feeding (IYCF) practices. An increase in mother's education and increased household wealth were associated with more appropriate complementary feeding practices (6).

Age of the infant as well as caregiver's education level were found to be significantly associated with compliance with WHO guidelines on multivariate logistic regression. This is similar to previous studies that have reported that education level of the caregiver is associated with both complementary feeding practices and nutritional outcomes. For instance, lower maternal education and lower household wealth index were found to be the most consistent factors influencing inappropriate CF practices in the South Asian region (14). In Kenya, significant differences between malnourished children and children with normal nutritional status in relation to the education levels of their mothers and their fathers have been reported (8). In that study, the child was more likely to be malnourished if he/she came from a family where both parents had low and no education.

Gender of the child, as it affects feeding practices, was also explored in the qualitative arm of this study. Caregivers narrated the myth that 'boys feed more than girls', although this did not influence their feeding choices. This is in contrast to a study by, Kimani-Murage *et al* (9) that found male gender was associated

with earlier introduction of complementary feeds. The reason for this, though given anecdotally, was that boys did not seem to achieve satiety with breast milk alone. This fits into the aforementioned myth that boys have higher nutritional demands than girls.

Cultural beliefs concerning complementary feeding practices were varied as caregivers came from different cultural backgrounds. Prohibitions, though freely quoted by caregivers, were mostly ignored because respondents felt that they were outdated. This is in contrast to a study in South Africa which found strict adherence to cultural beliefs (15). This is likely because the South African study was conducted in a rural setting, as opposed to this study which was done in an urban setting. However, some caregivers conceded that their practice had been affected by culture, albeit subconsciously. For example, there was a tendency to overfeed with certain starches such as potatoes and pumpkins and a hesitance to introduce some animal proteins like eggs. A commonly held cultural belief was that eggs, if given early, would cause a delay in the child's speech. However, on correlation with the quantitative data, it was found that almost half of the caregivers had given eggs to their children in the twenty-four hours prior to the study. Many caregivers also reported that their culture advocated for early introduction of complementary feeds. This, again, was not reflected in actual practice as most caregivers reported introducing complementary feeds at six months.

Caregivers in this study had access to multiple sources of information regarding complimentary feeding. Majority of them still considered the paediatrician their primary source of information and listed previous experience, the internet, relatives and friends as other influencers. The internet, in particular, served to provide supplementary information as well as support since it allowed for connection with other caregivers. Most caregivers attended the six-month clinic and received some nutritional advice. However, the qualitative aspect of this study revealed that there was inconsistency in the information given. This is likely due to lack of standardised protocol for complementary feeding at the well-baby clinic. The time constraint of a busy clinic also posed a challenge to the successful delivery of nutritional advice. This calls for a multidisciplinary approach to the problem, for example, involving nurses and nutritionists. Caregivers also lacked in-depth understanding about the importance of various guidelines. All these factors led to a disparity between the level of knowledge and full compliance with the guidelines. These findings are similar to those of a study done at Mbagathi District Hospital, Nairobi, that found lack of consistency in information delivered to caregivers by health care workers which led to a disparity between knowledge and practice(7).

The internet as a source of information was frequently mentioned. A variety of sources ranging from scientific research papers to online interactive sites to popular social media platforms like Facebook were quoted. The internet was seen as an authority by some caregivers but others approached it with more caution and confirmed the information therein with their healthcare provider. Plantin *et al* (16) in their review found that majority of parents went online in search of information or support. An important reason for this was weakened social support from caregiver's relatives and friends. Professionals had responded to this interest by offering online information as well as support. Benefits such as increased

access to resources, without an added cost implication, and the ability to meet the demand for information round the clock were cited.

We found that caregivers were least compliant to the guidelines on continued breastfeeding to the age of two years, with a compliance rate of 74%. Of the children still being breastfed, 65.9% were aged 9–12 months, 25.8% were 13–18 months while 8.3% were 19–24 months. This rate of continued breastfeeding is still higher than reported in middle income populations in high income countries. In Australia, for example, a cohort study found that 31.8% of women breastfed to 12 months and only 7.5% to 24 months (13).

An increase in the age of the infant in this study was associated with discontinuation of breastfeeding ($P < 0.001$). This is similar to a study done in Tanzania (17) where breast feeding rates were also reported to decrease with age. The two main reasons given for discontinuation were the child losing interest in breastfeeding and insufficient milk. This may be an indication of the need to continue lactation support beyond the immediate post-partum period and educate mothers on the importance of continued breastfeeding. Findings from the qualitative arm of this study underscored the role that lactation nurses played in encouraging mothers to continue breastfeeding. They followed mothers through phone calls and offered a holistic approach to lactation management, including addressing the psycho-social aspects.

Majority of the caregivers in this study were professionals who cited time as a major challenge for clinic attendance, which meant less contact time with the healthcare workers. Time constraints also affected the extent to which some caregivers were able to plan, prepare and feed their children. There was, however, no significant association between profession and compliance with the WHO feeding guidelines. This may be due to the fact that the study was done in a tertiary hospital based in an urban setting and most caregivers were professionals. Pelto *et al* reviewed case studies on improving feeding practices and found that time constrains was the most recurring theme. Caregivers often had competing demands on their time that created constraints on care-giving. This was true for both urban and rural settings, since most caregivers today must also engage in an income-generating activity. The time factor was found to affect the selection and preparation of foods, as well as feeding styles (18). The structure of the well-baby clinic and the protocol developed must bear these factors in mind, if it is to impact the feeding practices of caregivers in our setting.

Majority of respondents in this study afforded private healthcare, either as part of an insurance scheme or out-of-pocket. Resources, however, are finite and this meant that some items were out of reach. This was especially true for caregivers who had underweight or allergy-prone babies and needed special formulas. Some parents wanted to expose their children to a wider variety of foods but found the cost of items that are not locally produced prohibitive. Socioeconomic status was not studied in the quantitative aspect of this study but has been found to be significantly associated with adherence to guidelines and nutritional outcomes in previous studies (8).

Fear of allergies emerged as a factor affecting introduction of various foods by caregivers, particularly protein rich foods. In some cases, the fear was well founded because of past experiences while in others, the fear was founded on suspicion or a myth. In cases where certain foods were completely restricted, suitable alternatives were not always available. In other cases, the caregiver opted to delay introduction of certain foods that are commonly known to be allergenic. There is currently no guideline on when potentially allergenic foods should be introduced. However, a recent randomized trial found that peanut and egg allergy were less prevalent in an early introduction group of three months than in the standard introduction group of six months (19). While the recommendation is certainly not to introduce allergenic foods in the third month of life, the findings suggest that late introduction of allergenic foods may actually predispose young children to development of allergies. This issue therefore needs to be addressed during development of complementary feeding guidelines.

Caregivers who worked outside the home had to rely on others to assist in preparing meals and feeding of their children. Good support in these areas positively affected feeding practices, as has also been reported in previous studies. A Gambian study, for instance, found that the social support network of mothers affected adherence to the infant care guidelines. The husband was reported as the most important of these support systems (20).

Regarding health-worker support, caregivers emphasized the important role played by nurses in giving holistic support, especially during the initial lactation period. When it came to complementary feeding, however, nurses were the least reported as an information source. This may be due to the fact that there were only two dedicated lactation nurses who focused mostly on establishing and supporting the initial breastfeeding period. The same emphasis is, however, not made for complementary feeding or continued breastfeeding. Numerous studies have shown the important role that can be played by health workers in influencing caregivers' feeding practices. A randomized trial on the efficacy of breastfeeding support provided by trained clinicians, for instance, showed that there was an improvement in breastfeeding outcomes with the intervention of a routine, preventive, outpatient visit (21). More training and support of all cadres of healthcare workers is needed to achieve this.

Conclusion

The overall compliance with WHO complementary feeding guidelines was 43.1%. Factors positively associated with compliance with complementary feeding guidelines were younger age of the child, access to multiple sources of information as well as support from health workers and family. A below-college education level of the caregiver, lack of specific and practical guidelines, resource constraints and fear of allergies were the factors found to negatively impact compliance.

Health workers play an important role in influencing caregivers' feeding practices. As such, there is need to train and support nurses, nutritionists and all clinicians who work with children, to take up this role.

Comprehensive complementary feeding guidelines should be included in the mother and child booklets and online platforms explored in further education of caregivers. Health care workers should especially be

vigilant to emphasize this information to those groups identified as likely to be non-compliant.

The areas identified for further research include: modifiable factors associated with childhood obesity, interventional studies of measures that would improve compliance to complementary feeding guidelines as well specifically studying borderline pre-terms who are known to have feeding difficulties.

Declarations

Ethical Approval and Consent to participate

Ethical approval to conduct this study was obtained from the Aga Khan University (Nairobi) Research Ethics Committee Ref 2017/REC-88(v2).

Written informed consent was sought from the study participants and the hard copy forms retained by the Department of Paediatrics and Child Health.

Personal information was encrypted in order to maintain confidentiality.

Consent for publication

All the authors have read the manuscript before submission and give consent for publication

Availability of data and materials

Questionnaires, audio recordings, transcripts and notes were stored in a locked cabinet (hard copies) and in password protected computers. At the end of the study, all data was handed over to AKU Faculty of Health Sciences as per section 4.1.6(f) of the Faculty manual of research policies and procedures. The dataset(s) supporting the conclusions of this article is(are) included within the article (and its additional file(s)).

Competing Interests

There are no conflicts of interest to declare.

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Author Contributions

CMN, CKM, AN and MSL were all involved in the design of the study, analysis and the review of this manuscript. CMN conducted the study and wrote the manuscript

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References

1. WHO. Indicators for assessing infant and young child feeding practices. Conclusions of a consensus meeting held 6–8 November 2007 in Washington, DC, USA. 2008.
2. UNICEF. Nutrition in the First 1,000 Days. The State of the World's Children. 2012.
3. UNICEF. FROM THE FIRST HOUR OF LIFE Making the case for improved infant and young child feeding everywhere Key Findings 2016 Indicators Recommended Practices. 2016.
4. WHO. Global Strategy on Infant and Young Child Feeding. World Health Organization. 2008.
5. Kenya National Bureau of Statistics. Kenya Demographic and Health Survey 2014. 2015.
6. Bakalemwa R. Association Between Malnutrition and Feeding Practice Among children aged 6-24 months at Mbagathi District Hospital, Kenya. The University of Nairobi; 2014.
7. Kimani-murage EW, Madise NJ, Fotso J, Kyobutungi C, Mutua MK, Gitau TM, et al. Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi Kenya. BMC Public Health. 2011;11(1):396.
8. WHO. Complementary feeding. 2001.
9. Green LW, Kreuter MW. Health Program Planning An Educational and Ecological Approach. Fourth edi. New York: McGraw-Hill; 2005.
10. Richie J, Spencer L. Qualitative data analysis for applied policy research In: Bryman A, Burgess R (eds) Analysing Qualitative Data. Bryman A, Burgess RG, editors. London: Routledge; 1994.
11. Senarath, U., Agho, K. E., Akram, D., Godakange, S. S., Hazir, T., Jayawickrama, H. J, N., Kabir, I., Khanam, M., Patel A and O. Comparisons of complementary South, feeding indicators and associated factors in children aged 6–23 months across five Countries. Asian Matern child Nutr. 2012;8(s1):89–106.
12. Kruger R, Gericke GJ. A qualitative exploration of rural feeding and weaning practices, knowledge and attitudes on nutrition. Public Health Nutr. 2003;6(2):217–23.
13. Otaigo ML. Correlates of Complementary Feeding Practice Among Caregivers of Infants and Young Children Aged 6-24 Months At. The University of Nairobi; 2014.
14. Plantin L, Daneback K. Parenthood, information and support on the internet. A literature review of research on parents and professionals online. 2009;12:1–12.
15. Vitta BS, Benjamin M, Pries AM, Champeny M, Zehner E, Huffman SL. Original Article Infant and young child feeding practices among children under 2 years of age and maternal exposure to infant and young child feeding messages and promotions in Dar es Salaam, Tanzania. 2016;12:77–90.
16. Pelto GH, Levitt E, Thairu L. Improving feeding practices: Current patterns, common constraints, and the design of interventions. 2003;24(1):45–82.

17. Perkin MR, Ph D, Logan K, Ph D, Tseng A, Raji B, et al. Randomized Trial of Introduction of Allergenic Foods in Breast-Fed Infants. 2016;1733–43.
18. Nabwera HM, Moore SE, Mwangome MK, Molyneux SC, Darboe MK, Camara-trawally N, et al. The influence of maternal psychosocial circumstances and physical environment on the risk of severe wasting in rural Gambian infants: a mixed methods approach. 2018;1–19.
19. Prospective PVA, Berchotteau M, Bouchon N, Schelstraete C, Vittoz J, Participants A. Efficacy of Breastfeeding Support Provided by Trained Clinicians During an Early, Routine, Preventive Visit: A Prospective, Randomized, Open Trial of 226 Mother-Infant Pairs. 2005;115(2).
20. UNICEF / WHO / World Bank Group. Joint Child Malnutrition Estimates Key findings. 2020;
21. Mameli C, Mazzantini S, Zuccotti GV. Nutrition in the First 1000 Days: The Origin of Childhood Obesity. 2016;

Figures

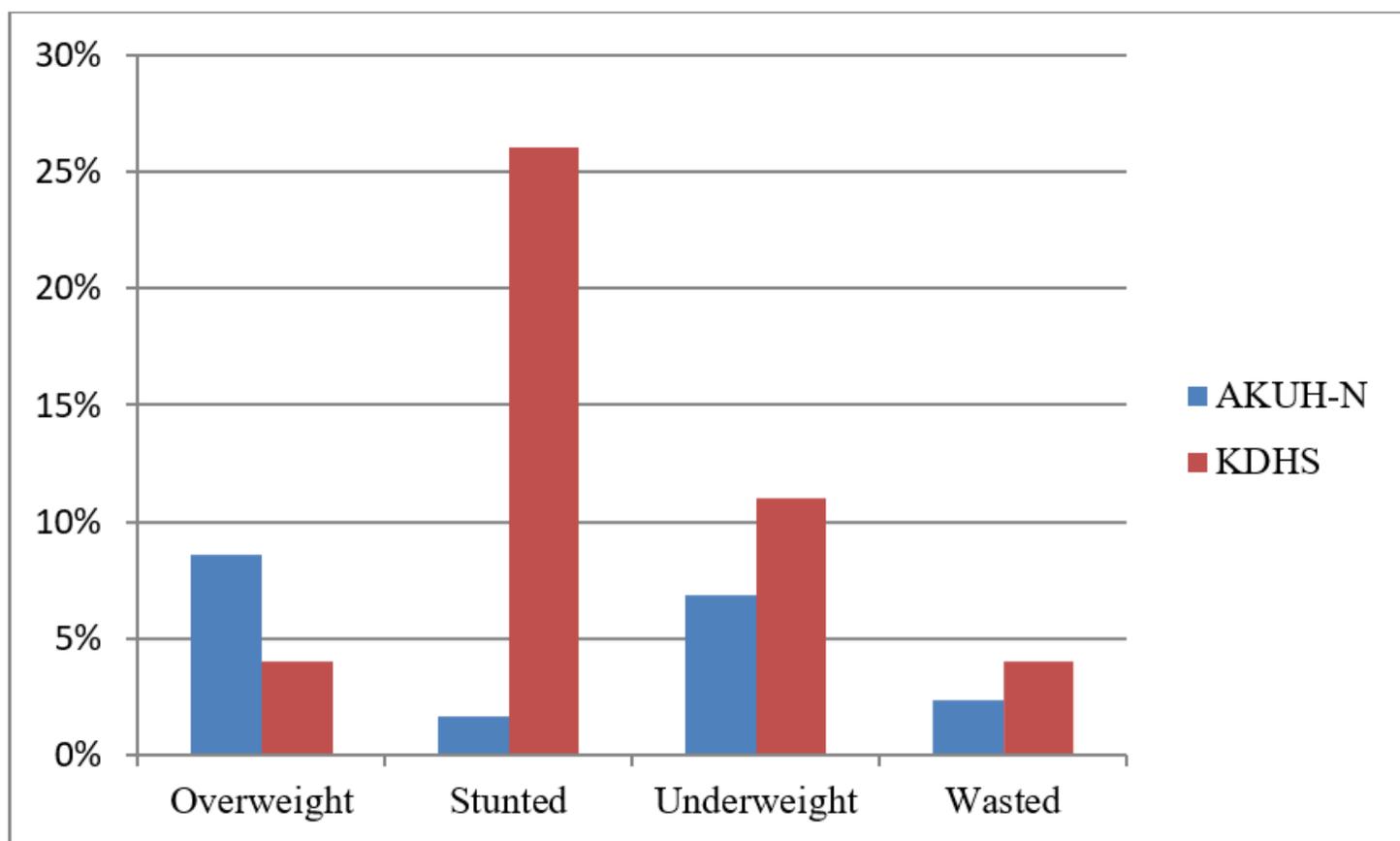


Figure 1

Comparison between AKUH-N and KDHS 2014 nutritional outcomes

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Questionnaire.docx](#)
- [InterviewGuide.docx](#)
- [SupplementaryFileIII.docx](#)