Original Article

Situational analysis of infant and young child nutrition policies and programmatic activities in Niger

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Abstract

Due to limited progress towards reducing mortality and malnutrition among children <5 years of age, an alliance of international agencies joined to 'Reposition children's right to adequate nutrition in the Sahel,' starting with a situational analysis of current activities related to infant and young child nutrition (IYCN). The main objectives of this analysis are to compile, analyse, and interpret available information on infant and child feeding and the nutrition situation of children <2 years of age in Niger, as one of the six targeted countries. Between August and November 2008, key informants responsible for conducting IYCN-related activities in Niger were interviewed, and 90 documents were examined on: optimal breastfeeding and complementary feeding practices, prevention of micronutrient deficiencies, prevention of mother-to-child transmission of HIV, management of acute malnutrition, food security, and hygienic practices. The results reported are limited by the availability of documents for review. Mortality rates are on track to reaching the Millennium Development Goal to reduce mortality among young children by two-thirds by 2015, but there has been no change in undernutrition, and total mortality rates are still high among young children. Nearly all of the key IYCN topics were addressed, specifically or generally, in national policy documents, training materials, and programmes. A national nutrition council meets regularly to coordinate programme activities nationally. Many of the IYCN-related programmes are intended for national coverage, but few reach this coverage. Monitoring and impact evaluations were conducted on some programmes, but few of these reported on whether the specific IYCN components of the programme were implemented as designed or compared outcomes with non-intervention sites. Human resources have been identified as inadequate to fully carry out nutrition programmes in Niger. Due to these limitations, we could not confirm whether the lack of progress in reducing malnutrition was due to ineffective or inadequately implemented programmes, though both of these were likely contributors. The policy framework is well established for the promotion of optimal IYCN practices, but greater resources and capacity building are needed to: (i) increase human capacities to carry out nutrition programmes; (ii) expand and track the implementation of evidence-based programmes nationally; (iii) improve and carry out monitoring and evaluation that identify effective and ineffective programmes; and (iv) apply these findings in developing, expanding, and improving effective programmes.

Keywords: developing country, infant and young child nutrition, national policies, nutrition programs, monitoring and evaluation, West Africa, Niger.

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Background

Niger is a landlocked country of 1.2 million square kilometres located on the southern fringe of the Sahara desert. Its neighbours are Mali, Algeria, and Libya to the west and north; Chad to the east, Nigeria directly to the south and Benin and Burkina Faso to the south-west (Fig. 1). Niger is divided into seven administrative regions, plus the capital of Niamey. Of the estimated 15.3 million inhabitants [July 2009 (1)], 49.6% are less than 15 years of age and the average birth rate is nearly eight per woman. Niger's economy is based on subsistence crops, livestock, and uranium. Niger's uranium stores are some of the largest in the world.

The GDP is estimated in 2008 at 700 USD per capita. About 11% of the land mass is considered arable, and well under 1% of land is planted in permanent crops (1). The average rainy season lasts from April to October in the middle to south of the

country, but rain generally only falls during August in the north. The short rainy season and highly variable rainfall lead to intermittent devastating droughts and food shortages. The most difficult period is between June and September, when the previous harvest is consumed and the new harvest has not yet arrived (2).

No progress has been reported towards achieving Millennium Development Goal (MDG) I: to reduce hunger in the population by half between 1990 and 2015, as measured in MDG 1.8 by the prevalence of underweight among children less than 5 years of age (Fig. 2). The prevalence of stunting and wasting has also not improved in recent years.

By contrast, estimated mortality rates among children <5 years of age decreased substantially between 1990 and 2006 (Fig. 3), indicating that Niger appears to be nearly on track towards reaching MDG 4.1, to reduce under 5 mortality by two-thirds by 2015. Despite this very noteworthy achievement, Niger is

Fig. 1. Map of Niger: Courtesy of the United Nations Office for the Coordination of Humanitarian Affairs, Regional Office (OCHA).

Fig. 2. Niger – trends in underweight (WAZ <-2), stunting (HAZ <-2), and wasting (WHZ <-2) among children <5 years as collected in national Demographic and Health Surveys (DHS) or national nutrition surveys. (a) Underweight compared with the Millennium Development Goal (MDG), MDG is half the 1992 value. Data represents findings according to the World Health Organization's Child Growth Standards from: Macro International Inc. 2009. Measure DHS STATcompiler: <http://www.measuredhs.com>, February 19, 2009. (b) Stunting and wasting, 1992 (3) and 2006 (4).

still ranked 13th globally in high child mortality rates, highlighting the need to continue efforts to reduce childhood deaths.

Niger was one of the first countries in Africa to integrate vitamin A supplementation into semi-annual or annual national vaccination days, and researchers have linked this to reductions in mortality rates (5, 6). This programme has expanded successfully to many other countries in the region.

Public sector nutrition services are organized under the Ministry of Public Health. Within this ministry, the Nutrition Division directs all aspects of nutrition pro-

motion nationally. Other relevant divisions and directions within the Ministry of Public Health include the Direction of the Health of the Mother and the Child, the Direction of Programs and Studies, and the National Program to Fight Malaria. Other governmental agencies with IYCN-related activities include the Direction of Studies and Census under the Ministry of Economy and Finances and the Information System for Agricultural Markets under the Ministry of Agricultural Development. Most of these agencies address various aspects of food security and the management of malnutrition.

Fig. 3. Niger – mortality rates among children <5 years, estimate for 1990, Demographic and Health Survey (DHS) 2006, and the 2015 Millennium Development Goal (MDG; dotted line to final bar) Data sources: <http://www.childmortality.org/>; 2015 goal is one-third of 1990 estimate.

There is also a strong presence of international and national non-governmental agencies which focus on various nutrition-related activities (see Supporting Information, Appendix S1). A nutrition coordination group of national and international agencies has been established and meets on a regular basis in Niamey to collaborate on nutrition activities across Niger. Although reports were not formalized for our review, this group also works to gather data on programme training, coverage, and supply chain management.

The main objectives of the situational analysis are to compile, analyse, and interpret available information on infant and child feeding, and the nutrition and health situation of children <2 years of age in the six target countries (Burkina Faso, Chad, Mali, Mauritania, Niger, Senegal). Additional aims were to identify inconsistencies with international recommendations and gaps in programme activities, and to provide recommendations based on these findings to guide the development of more effective IYCN-related programmes and activities.

Methods and data collection

From August to November 2008, the Nigerien project coordinator visited nutrition focal points or other relevant representatives of organizations participating in IYCN activities. These organizations

were identified by members of the national nutrition counsel to obtain information on their respective programs. Some follow-up continued after these dates to collect additional information or clarify uncertainties in data obtained previously. Thirty-one organizations were contacted, 21 of which completed a questionnaire regarding their IYCN activities and shared 90 pertinent documents that were reviewed for inclusion in this analysis (see Supporting Information Appendix S1). Unfortunately, there was a substantial number of documents that we were not able to obtain from agencies contacted, and some activities conducted by these organizations were not fully described in the reports obtained. Therefore, the present analyses are limited by the lack of availability of some documentation. It would have been beyond the scope of these analyses to include all documents and activities regarding HIV, food security, and hygiene. Therefore, we focused on respective activities that targeted infants and young children. We found few food security programmes with specific activities targeted at young children. Because the family's food security status has an impact on the health and nutritional status of young children, we provide a brief overview of food security tracking that is taking place in-country.

The documents obtained that covered IYCN-related activities include: (i) national policies, strate-

gies, and plans of action; (ii) research studies related to barriers and beliefs concerning IYCN-related behaviours; (iii) other formative research; (iv) training materials, programme protocols, and curricula; (v) documentation of programmes implemented, with the intended and actual program coverage, where available; and (vi) programme monitoring and evaluation reports, with available surveys. In the following, ‘surveys’ refer to cross-sectional data collected among a selected subset of the population. These surveys are not necessarily related to a programme or study. ‘Monitoring’ refers to studies that evaluate the implementation of a specific programme and whether it is implemented according to protocol. ‘Evaluation’ refers to findings regarding the outcomes or impact of a programme.

The topics we reviewed in these documents included: promotion of breastfeeding and complementary feeding practices, prevention of micronutrient deficiencies, management of acute malnutrition, prevention of mother-to-child transmission of HIV, food security, and hygienic practices. The criteria for comparison are outlined in Table 1 and in the introductory chapter in this issue (7). Reported activities and gaps in information are discussed in the following sections by feeding practice or nutrition-related supporting activity. Due to the number of activities and documents reviewed, we were only able to discuss the most relevant activities in this publication. Summary tables of additional activities and documents identified are listed in Supporting Information Appendix S1.

Results

The following sections present the findings of the situational analyses by infant and young child feeding practice and supporting nutrition-related activities. These findings are summarized in Table 1 by feeding practice or supporting nutrition-related activity (rows) and by type of document reviewed (columns). The section on breastfeeding (Promotion of optimal infant and young child feeding practices) provides examples on how Table 1 was completed, and the contents are further explained in the table’s footnotes.

Promotion of optimal infant and young child feeding practices

Breastfeeding

National policies, strategies, and plans of action

National policies, strategies, and/or plans of action promote all three key breastfeeding practices [timely introduction of breastfeeding in the first hour after birth (8), exclusive breastfeeding to 6 months (8–10), and continued breastfeeding with complementary foods to at least 24 months (8–10)]. In addition, surveys by IBFAN (11) indicate that many provisions of the International Code for the marketing of breast milk substitutes have been ratified (12) and the full Code is under consideration. Thus, there are check marks in the first three rows of the first column of Table 1 to indicate the promotion of these activities in these legislative documents.

Formative research

The first two breastfeeding practices listed in Table 1 are addressed in small-scale studies (13, 14). Reported barriers to exclusive breastfeeding included a belief that there is no life without water, thus water is provided very early to infants, and that teas should be used to satiate the infant so the mother can work or sleep. The use of a ‘blessed water’ prior to initiating breastfeeding was also identified. Reported discussions with religious leaders indicated that they were willing to allow infants to breastfeed before this water was provided, but fathers were not. In another small study, mothers of one ethnic group reported a positive belief that breast milk was adequate for the first 6 months of the infant’s life and that providing water during this time could lead to illness (15), but mothers of another local ethnic group did not believe that infants could wait to consume water.

Although these surveys were only conducted among women in limited sites, they provide useful insight into some local beliefs that could be evaluated fairly quickly in various settings to identify target audiences and topics for educational messages.

Table 1. Summary of actions documented with respect to key infant and young child feeding practices in Niger

Key practice [†]	Summarized findings by type of document reviewed, with selected national-level findings*							
	Policies	Formative research	Protocols/ training	Programmes	Intended programme coverage	Actual programme coverage	Programme monitoring	Surveys and evaluation
Promotion of optimal feeding practices								
Timely introduction BF, 1 h	✓	✓	✓	✓	National	Sub-national	(✓)	48.3% [‡]
EBF to 6 months	✓	✓	✓/-✓	✓/-✓	National	Sub-national	(✓)	8.4% [§]
Continued BF to 24 months	✓	(✓)	✓	✓	National	Sub-national	(✓)	62.3% [¶]
Introduce CF at 6 months	✓	(✓)	✓/-✓	✓	National	Sub-national	(✓)	72.2%**
Nutrient dense CF	✓	✓	(✓)	(✓)	National	N/I	(✓)	12.9% VA 7.8% MFP ^{††}
Responsive feeding	N/I	N/I	N/I	N/I	N/I	N/I	N/I	N/I
Appropriate frequency/ consistency	N/I	✓	✓	N/I	N/I	N/I	(✓)	47.8% ^{‡‡}
Dietary assessments to evaluate consumption	N/I	(✓)	N/I	N/I	n/a	n/a	(✓)	(✓) ^{§§}
Prevention of micronutrient deficiencies								
Vitamin A supplements young children	✓	(✓)	✓	✓	National	69.6% ^{¶¶}	(✓)	N/I
Postpartum maternal vitamin A supplementation	✓	✓	✓	✓	National	22.2%***	(✓)	12.5% ^{†††}
Zinc to treat diarrhoea	✓	N/I	✓	✓	National	Sub-national	N/I	N/I
Prevention of zinc deficiency	N/I	N/I	N/I	N/I	N/I	N/I	N/I	N/I
Anaemia prevention (malaria, parasites)	✓	(✓)	✓	✓	National	Sub-national	7.4% 6.7% ^{‡‡‡}	83.9% <11 g dL ^{-1§§§}
Anaemia prevention (iron/folic acid in pregnancy)	✓	✓	N/I	✓	National	National	14.0% ^{¶¶¶}	45.6% <11 g dL ^{-1****}
Assessment of iron deficiency anaemia	N/I	✓	N/I	N/I	N/I	N/I	N/I	N/I
Iodine programmes	✓	✓	✓	✓	National	49.0% 46.0% ^{††††}	(✓)	35.8% ^{‡‡‡‡}
Special circumstances								
Management of malnutrition	✓	✓	✓	✓	National	Sub-national	(✓)	12.4% WHZ 54.8% HAZ 39.9% WAZ ^{§§§§}
Prevention MTCT HIV/ AFASS	(✓)	(✓)	N/I	✓	Regional	Sub-national	52.5% ^{¶¶¶¶}	N/I
Food security	✓	✓	(✓)	✓	National	National	(SAP)	N/I
Hygiene and food safety	✓	N/I	✓	✓	N/I	N/I	8.4% ^{*****}	N/I
Related tasks								
IEC/BCC in programmes*	✓	(✓)	✓	✓	National	Regional	✓	✓

EXPLANATION OF TABLE HEADERS AND MARKINGS:

✓ Confirmed documentation of actions specific to these key practices

N/I No documentation of the activity was provided or identified

(✓) Actions more generally related to the key practices, but without referencing the practice specifically.

-✓ Practice that is addressed but that is not specifically consistent with international norms – e.g. in case of anaemia: haemoglobin assessments are used and these cannot distinguish the cause of the anaemia, but treatments only address iron deficiency anaemia.

n/a Not applicable

[†]KEY PRACTICES AND RELATED ACTIVITIES AS OUTLINED IN TEXTBOX 1 IN THE DETAILED METHODS PAPER IN THIS ISSUE (7).**Timely introduction of breastfeeding, 1 h**, commencement of breastfeeding within the first hour after birth.**EBF to 6 months**, exclusive breast feeding, with no other food or drink, other than required medications, until the infant is 6 months of age.**Continued BF to 24 months**, continuation of any breast feeding until at least 24 months of age as complementary foods (CF) are consumed.**Initiation of CF at 6 months**, gradual commencement of CF at 6 months of age.**Nutrient dense CF**, promotion of CF that are high in nutrient density, particularly animal source foods and other foods high in vitamin A, iron, zinc.**Responsive feeding**, encouragement to assist the infant or child to eat, and to feed in response to hunger cues.

Table 1. Footnote Continued

Appropriate frequency/consistency, encouragement to increase the frequency of CF meals or snack as the child ages (two meals for breastfed infants 6–8 months, three meals for breastfed children 9–23 months, four meals for non-breastfed children 6–23 months, ‘meals’ include both meals and snacks, other than trivial amounts and breast milk), and to increase the consistency as their teeth emerge and eating abilities improve.

Dietary assessments to evaluate consumption, indicates whether dietary assessments are being conducted, particularly those that move beyond food frequency questionnaires.

Vitamin A supplements young children, commencement of vitamin A supplementation at 6 months of age and repeated doses every 6 months.

Postpartum maternal vitamin A, vitamin A supplement to mothers within 6 weeks of birth.

Zinc to treat diarrhoea, 10 mg day⁻¹ for 10–14 days for infants and 20 mg day⁻¹ for 10–14 days for children 12–59 months.

Prevention of zinc deficiency, provision of fortified foods, or zinc supplements to prevent the development of zinc deficiency among children > 6 months.

Anaemia prevention (malaria, parasites), iron/folate supplementation during pregnancy, insecticide-treated bed nets (ITNs) for children and women of child-bearing years, anti-parasite treatments for children, and women of child bearing years.

Assessment of iron deficiency anaemia, any programme to go beyond the basic assessment of haemoglobin or hematocrit to assess actual type of anaemia, such as use of serum ferritin or transferrin receptor to assess iron deficiency anaemia.

Iodine programmes, promotion of the use of iodized salt; universal salt iodization or other universal method of providing iodine with programmes to control the production and distribution of these products.

Management of malnutrition, diagnosis of the degree of malnutrition, treatment at reference centres/hospitals for severe acute malnutrition and appropriate follow-up in the community, or local health centre; or community-based treatment programmes for moderately malnourished children.

Prevention MTCT HIV/ AFASS, appropriate anti-retroviral treatments for HIV+ women during and following pregnancy to avoid transmission to the infant, exclusive breastfeeding to 6 months, breast milk substitutes only when exclusive breastfeeding is not possible and acceptable, feasible, affordable, sustainable and safe alternatives to breast milk are available, followed by gradual weaning or continued partial breastfeeding depending on the risk factors [see Textbox 4 of the introductory chapter to this issue (7)].

Food security, programmatic activities with impact on infant and young child nutrition (IYCN), including agency response to crises, tracking markers of food security and food aid distributions.

Hygiene and food safety, all aspects of appropriate hand washing with soap, proper storage of food to prevent contamination, and environmental cleanliness, particularly appropriate disposal of human wastes (latrines, toilets, burial).

***CATEGORIES OF ACTIONS UNDER WHICH THE KEY PRACTICES WERE CORRECTLY ADDRESSED.**

Policies, nationally written and ratified policies, strategies, or plans of action.

Formative research, Studies that specifically assess barriers and beliefs among the target population regarding each topic, and/or bibliographic survey of published studies related to programme development, as identified through PubMed search of ‘nutrition’ plus either ‘child’ or ‘woman’ plus the name of the country and/or by key informant.

Training/ curricula, programme protocols, university or vocational school curricula or other related curricula that specifically and correctly addresses each desired practice, these include pre- and in-service training manuals.

Programmes, documented programmes that are functioning at some level that are intended to specifically address each key practice listed.

Intended programme coverage, the level at which the programme is meant to be implemented, according to programme roll-out plans.

Actual programme coverage, the extent of programme implementation that was confirmed in one of the received documents.

Programme monitoring, monitoring activities that are conducted for a given programme that specifically quantify programme coverage, training, activities implemented, whether messages are retained by care-givers.

Surveys and evaluations, studies that have been conducted to evaluate changes in specific population indicators in response to a programme and/or cross-sectional surveys.

ADDITIONAL EXPLANATION

[‡]% infants reportedly put to the breast in the first hour after birth, from MICS/DHS 2006 data, [§]% infants at 4–5 months who consumed just breast milk during the day prior to the survey, from DHS/MICS 2006. [¶]% children 20–23 months who consumed any breast milk during the day prior to the survey, from DHS/MICS 2006. ^{***}% infants 6–7 months consuming solid or semi-solid complementary foods during the day prior to the survey, from DHS/MICS 2006. ^{††}% infants 6–9 months consuming VA (vitamin A-rich foods) or MFP (meat, fish or poultry) during the day prior to the survey, from DHS/MICS 2006. ^{‡‡}Per cent of children 6–24 months consuming the minimum frequency of complementary foods by age, from DHS/MICS 2006. ^{§§}Dietary data collected but results not reported (Keith and Ming); additional survey completed by Save the Children – United Kingdom; Consumption of various food groups collected in DHS/MICS 2006 but no quantitative data collected. ^{¶¶}% children 6–59 months who reportedly received vitamin A supplement in the 6 months prior to the survey, DHS/MICS 2006. ^{****}% women surveyed who reportedly received vitamin A postpartum for their last pregnancy in the prior 5 years, DHS/MICS 2006. ^{†††}% women surveyed who reported nightblindness during their last pregnancy in the prior 5 years, DHS/MICS 2006. ^{‡‡‡}% children and women, respectively, sleeping under insecticide treated bed nets (ITN), night prior to the survey, DHS/MICS 2006. ^{§§§}% children 6–59 months with whole blood haemoglobin <11 g dL⁻¹, DHS/MICS 2006. ^{¶¶¶}% women 15–49 years who took iron-folic acid supplements for ≥90 days during the last pregnancy in the previous 5 years, DHS/MICS 2006. ^{*****}% haemoglobin <11 g dL⁻¹ for women 15–49 years, DHS/MICS 2006. ^{††††}% children <5 years living in households with adequately iodized salt and % households with same, ≥15 ppm, DHS/MICS 2006. ^{‡‡‡‡}% grades I and II goitre among scholars, 1994 national survey as reported online at: <http://www.who.int/vmnis/iodine/data/database/countries/en/index.html> as: Hamani D. Enquête nationale sur la prévalence du goitre au Niger – Rapport No.1 [National survey on goitre prevalence in Niger – Report no. 1]. Niamey, UNICEF. ^{§§§§}% children <5 years with <–2 z-score: weight-for-height (WHZ), weight-for-age (WAZ), height-for-age (HAZ), by WHO Growth Standards, per DHS/MICS 2006. ^{¶¶¶¶}% women 15–49 years reporting knowledge that HIV can be passed mother-to-child through breastfeeding, DHS/MICS 2006. ^{*****}% households with access to appropriate disposal method for human wastes (toilet, latrine), DHS/MICS 2006.

Training materials, protocols, and manuals

Timely introduction of breastfeeding in the first hour and exclusive breastfeeding to 6 months were each specifically addressed in the training materials reviewed (16–22). Thus, checkmarks are included in the respective cells in Table 1. Although educational messages taught at various health centres may address barriers to optimal breastfeeding practices, we found no examples in documents reviewed.

Because two of the older training materials still recommended exclusive breastfeeding to just 4–6 months, instead of to 6 months (18, 20), Table 1 also has a checkmark preceded by a negative sign in this cell to indicate that some training materials do not fit current recommendations.

Programmes

Several programmes promoted the commencement of breastfeeding within the first hour after birth and continuing breastfeeding to 6 months of age (14, 19, 20, 23–26), but none promoted the continuation of breastfeeding to 24 months of age. National policies promote the use of the Essential Nutrition Actions (ENA) approach nationally, and the ENA promotes all three key breastfeeding practices. Thus, the cells on programming in Table 1 contain checkmarks and the intended coverage is listed as 'national'. However, we could only confirm this or other programmes promoting the key breastfeeding practices were being implemented in certain regions, thus the actual coverage is listed as 'sub-national' in Table 1. As with training materials, one older document still recommended exclusive breastfeeding to just 4–6 months of age (25).

The ENA approach provides the best guidance on the use of information education communication (IEC) and behaviour change communication (BCC) in promoting breastfeeding. This and other documents provided little guidance on how to present these messages through group education sessions, which would be the most likely method of information dissemination with limited human resources.

Surveys, monitoring, and evaluation

The checkmarks in parentheses in the column for programme monitoring demonstrate that general monitoring was conducted among programmes that promoted breastfeeding practices, but the quality of the breastfeeding components of these programmes was not assessed. We also found no programme evaluations that assessed the impact of these programmes on participants' breastfeeding practices. Because impact evaluations are not available, the final column of Table 1 provides findings from the most recent DHS and/or MICS surveys.

Reported breastfeeding rates appear to have improved from 1992 to 2006 according to Demographic and Health Survey (DHS) reports (Table 2) (3, 4, 27, 28). The introduction of breastfeeding in the first hour increased from about 20% to about 50%. The prevalence of exclusive breastfeeding among all infants <6 months of age, which was almost non-existent in 1998, increased to 14% in 2006. However, the 2007 national nutrition survey reported much lower prevalences in timely introduction of breastfeeding and exclusive breastfeeding in the first 6 months. Data collection methods should be evaluated and additional statistical analyses are needed to

Table 2. Breastfeeding practices among children <24 months according to national survey findings in Niger

Breastfeeding indicator	1992 DHS (3)	1998 DHS (27)	2006 DHS (4)	Oct/Nov 2007 National nutrition survey (28)
% infants put to the breast in the first hour	20%	28%	48%	25%
% exclusive breastfeeding among infants <6 months of age	<1%	<1%	14%	9%
% infants breastfed at 22–23 months	n/a	39%	62%	n/a

DHS, Demographic and Health Survey; n/a, data not available; standard errors not reported.

determine whether these are actual changes in prevalence or due to data collection or analyses.

We found no national programmes implemented between 1992 and 2006 that might have contributed to these improvements, if real. One possible contributor is the finding that many of the programmes implemented in Niger include IEC activities to enhance information dissemination. However, desirable breastfeeding practices are still very low.

The area charts depicting various feeding practices by age (Fig. 4a,b) identify reported increases in exclusive breastfeeding rates accompanied by decreases in

the use of non-milk liquids. However, the reported use of just water in addition to breast milk did not change. The use of water prior to 6 months of age is known to be associated with increased risks of diarrhoea and other infections (5,6), thus improvements in this practice could have an impact on the health of these infants.

Summary – Breastfeeding

- National legislation, training materials, and programmes specifically promote the three key internationally recommended breastfeeding practices.

Fig. 4. Niger – breastfeeding practices among infants and young children 0–24 months of age, based on feeding practices for the day prior to the survey. (a) Feeding practices reported in 1998 Demographic and Health Survey (DHS). (b) Feeding practices reported in 2006 DHS. Data courtesy of United Nations Children's Fund, West, and Central Africa Regional Office, as reported among last born children living with their mothers, DHS (a) 1998, (27) and (b) 2006, (4).

- Studies have evaluated barriers and beliefs that help and hinder optimal feeding practices, and most programmes incorporated some aspect of IEC. However, studies were not conducted in nationally representative samples and we found no examples of the educational messages used in addressing local barriers and beliefs.
- The prevalences of optimal breastfeeding practices reportedly improved in some recent national surveys, but are still far below desirable levels.
- The effectiveness of breastfeeding promotion programmes has not been evaluated and the actual coverage has not been documented, so it is difficult to determine whether existing programmes are contributing to changes in practice.

Recommendations – breastfeeding

- Researchers and programme managers should communicate more effectively to ensure that current and future research findings are incorporated into training materials and programme design. This is especially important in improving IEC messages and BCC approaches.
- Continued support is needed to ensure that improvements in breastfeeding practices continue and are maintained. This will require more rigorous monitoring and evaluation activities to identify effective programmes for expansion nationally and to confirm whether all relevant health workers are receiving training and supportive supervision.

Complementary feeding

National policies, strategies, and plans of action

The importance of complementary foods for young children is highlighted in several national nutrition documents (8–10, 29, 30), but unlike breastfeeding, very little detail is included in these documents in support of key complementary feeding practices. Further, the minimum nutrition activities described in the 2006 National Nutrition Policy (31) do not include any complementary feeding practices. However, this policy document did emphasize the need to shift from

treating malnutrition to preventing it through appropriate diets and possibly the use of fortified complementary foods.

Formative research

Keith *et al.* (13) and Poirson *et al.* (15), conducted small-scale surveys in which they identified several negative beliefs regarding the introduction of complementary foods, including that complementary feeding should accompany an abrupt reduction in breastfeeding, rather than a gradual change, and that simple millet porridge is adequate as a complementary food. A positive practice reported was that infants are allowed to progressively feed themselves, according to their capability to 'hold something in their hands'. Further analyses could identify how widespread are beliefs such as these, and which family members and decision makers are most responsible for deciding on complementary feeding practices. Based on study findings, Keith *et al.* (13) provided several specific recommendations for developing IEC messages to promote appropriate complementary feeding practices in the study population and other similar populations. The recommended messages included to: (i) offer the breast before each meal; (ii) buy liver each week for the infant and mother, (iii) avoid 'fura,' a low-nutrient local drink, prior to 3 years of age; (iv) increase vegetable consumption; and (v) find strategies to reduce the mother's workload and thus increase the time available to dedicate to her child/children.

Training materials and programmes

As with breastfeeding practices, the ENA approach (16), which is intended to be used nationally, promotes all key complementary feeding practices. Other relevant training documents address some, but not all of these recommended practices. A few small-scale programmes that promote complementary feeding practices were initiated in the 1990s or early 2000s (23, 26, 32). Identified national-level programmes did not commence until 2005 or 2006 (20, 21). The ENA approach was introduced most recently in 2008 (16).

We could not confirm whether the complementary feeding component of any of these programmes is implemented nationally.

Surveys, monitoring, and evaluation

We found no programme monitoring that assessed whether or how well complementary feeding practices were being implemented. The national nutrition surveys and DHS collected cross-sectional data on types of complementary foods consumed by children in the 24 h prior to the survey. Some of these data can be used to calculate the recently recommended core infant and young child feeding indicators: the prevalence of complementary feeding at 6–9 months and the per cent of children consuming the minimum number of meals per day. The details necessary to calculate the minimum diversity score and consumption of iron-rich or iron fortified foods are lacking.

The reported number of meals consumed by breastfed or non-breastfed children decreased from an average of 3.4 to 2.4 meals consumed in the previous day (1998 and 2006, respectively) (4, 27). This decrease appears to be substantial, but there were some differences in the survey questions, which could have altered responses. This highlights the importance of consistency in data collection to allow comparisons across time. If the noted differences are actual decreases in intakes, this could explain some of the lack of progress observed in reducing malnutrition during this period (Fig. 2).

The DHS 2006 (4) indicated that 23% of children 6–36 months had consumed a vitamin A-rich food in the prior 24 h. The proportion of infants who consumed iron-rich foods during the previous day was never greater than 50%. Overall, complementary foods (solid or semi-solid foods consumed during the 24 h prior to the survey) were reportedly given to 23% of infants 0–5 months of age, which is prior to the recommended age of commencement. On the other side, 22% of infants 6–9 months did not consume any complementary foods during the previous day (4). This body of findings shows that one-half to three-fourths of children in this national survey did not consume the desired quantity and quality of complementary foods during the day prior to the 2006 DHS.

In a household survey in one region of Niger, where food insecurity is high risk, nearly half of the population surveyed had insufficient resources to purchase an adequate diet year-round (33). This lack of resources may provide one explanation for the poor complementary feeding practices described earlier and the general lack of progress towards reducing underweight among young children.

Summary – complementary feeding

- Complementary feeding is addressed in national policies, training materials, and programmes, but just one training document, the ENA approach, provides guidelines on all the four key optimal complementary feeding practices.
- We found no monitoring and evaluation reports to confirm the coverage or effectiveness of implemented programmes at improving children's complementary feeding practices.
- National nutrition surveys, such as the DHS, demonstrate that less than one-third to one-half of children 6–23 months consumed vitamin A- or iron-rich complementary foods during the day prior to the survey (DHS 2006) and less than half consumed the minimum number of meals recommended.

Recommendations – complementary feeding

- Appropriate national legislation, training materials, and programme protocols should be expanded to provide more concrete high-level support for the promotion of all four key complementary feeding practices.
- There is a need to develop and provide locally pertinent educational messages to address the poor complementary feeding practices identified in national surveys. This requires identifying reasons for these practices, such as whether poor feeding practices are due to inadequate use of available nutrient-dense foods, or a more general lack of resources to obtain or prepare these foods.
- Affordable methods of providing nutritious foods to young children must be identified and agreed upon,

such as subsidized targeted fortified complementary foods or point-of-use fortificants.

- Programme monitoring and evaluation of resulting programmes must be rigorous enough to confirm whether the education or food reaches target populations and is effective at improving nutritional outcomes among young children.

Prevention and treatment of micronutrient deficiencies

As described in the introduction and Table 1, we reviewed relevant policies and programme-related documents with regard to the prevention of key micronutrient deficiencies, namely vitamin A, zinc, iron, and iodine.

Vitamin A

National policies, strategies, and plans of action

National policies promote the provision of vitamin A supplements (VAS) (8, 9, 31) semi-annually for children 6–59 months of age, and early postpartum for women. Plans for vitamin A fortification of selected foods are also promoted in national legislative documents (8, 30, 31).

Formative research

In one region of northern Niger, Blum *et al.* (34) interviewed 100 mothers who had raised several children, plus additional primary caregivers and health care providers, using hypothetical case scenarios to elicit local knowledge and attitudes about symptoms associated with vitamin A deficiency. They found that that night blindness was interpreted as a general 'lack of good food' and home remedies primarily included liver, meat, or green leaves. Conversely, the more severe manifestation of vitamin A deficiency, xerophthalmia, was believed to be caused by fever of acute infectious disease (particularly measles), and was either treated at home or at a health centre. This fairly rapid assessment identified barriers to care-seeking and topics for targeted educational messages in vulnerable populations. Aguayo *et al.* (35) identi-

fied characteristics of the successful integration of VAS into national vaccination days, such as high-level leadership and ownership by the Ministry of Public Health, planning, and implementation at the district-level, effective training and clear educational messages, flexible delivery mechanisms, and responsiveness in the Ministry of Health and its partners.

Training materials and programme protocols

National-level training materials describe the appropriate timing and dosage of VAS semi-annually for children 6–59 months and early postpartum for women (16, 18, 20). The guidelines in the ENA approach also encourage the consumption of vitamin A-rich foods, such as animal source foods, orange fruits, and vegetables or dark green leafy vegetables. The high bioavailability of vitamin A from animal source foods, compared with fruits and vegetables is not described.

Programmes

The national micronutrient day or campaign commenced in 1994 to provide VAS nationally (36) and VAS is also provided through health centres. During the national VAS distribution days, educational messages promote the consumption of vitamin A-rich foods. Other programmes which promote the use of vitamin A-rich foods were only found in three regions (22, 30, 36).

Voluntary fortification of cooking oil with vitamin A has commenced in Niger (37). Infants and young children are not likely to consume enough of this oil to have an impact on their vitamin A status. However, maternal breast milk vitamin A is likely to increase, and this may then have an impact on the vitamin A status of breastfed children.

Surveys, monitoring, and evaluation

VAS is currently reaching >80% of children 6–59 months during national campaigns (38). However, the coverage is not consistent across years. Reports in the 2006 DHS and 2007 national nutrition surveys (4, 28) were that just 70 and 55%, respectively, of children

had received VAS in the previous 6 months. The timing of the surveys during or following the national campaigns may have contributed to some of the variation observed. These surveys did not report on the proportion of infants who had received VAS at 6 months of age. The 2006 DHS reported that 66% of infants 6–11 months had received VAS in the previous 6 months compared with 69–71% among older children. Without the standard deviations, it is not possible to determine whether there is really a trend for reaching fewer infants with VAS than older children. This same DHS reported that just 13% of breastfed infants 6–9 months of age consumed vitamin A-rich fruits and vegetables during the day prior to the survey, and fewer consumed animal source foods which might have been rich in vitamin A. Although vitamin A food intake was higher among older children, overall intake was very low. Just 22% of women early postpartum had received VAS according to the 2006 DHS and 82% of women gave birth at home where VAS would not likely be available. Therefore, there is a need for greater emphasis on the promotion of vitamin A-rich foods and identification of additional intervention points to promote VAS early postpartum, such as during early infant vaccination or other health care visits or outreach activities. We found no recent evaluations of vitamin A status in Niger.

Summary – vitamin A

- National policies and programme-related activities address the importance of vitamin A through the promotion of vitamin A supplements semi-annually to children 6–59 months and to women early postpartum. The consumption of vitamin A-rich foods is also promoted through some national-level programmes.
- Although recent reports indicate that VAS is reaching >80% of children 6–59 months, coverage appears to be variable.
- VAS for women early postpartum is very low. Current distribution through hospitals and national VAS campaigns is unlikely to increase this coverage due to low use of hospitals for birthing and the semi-annual timing of national campaigns. Timing is likely also an issue in reaching infants at 6 months of age.

- The fortification of cooking oil has commenced in Niger, but this is unlikely to benefit young children except through breast milk.

Recommendations – vitamin A

- High-level support for semi-annual VAS campaigns should be continued and additional intervention points should be identified to ensure that VAS commences at 6 months of age, continues semi-annually through 59 months of age, and reaches the majority of women early postpartum.
- Support for oil fortification of cooking oil should continue, and studies should be conducted to confirm how this oil is used and whether there is any impact on the vitamin A status of women and breastfed children.

Zinc

National policies, strategies, and plans of action

National legislation did not address the prevention of zinc deficiency or the use of zinc supplements in treating diarrhoea. However, the National Nutrition Plan of Action (9) recognizes the possibility that zinc deficiency may occur in Niger; and zinc fortification (along with vitamin A and iron) is generally promoted in the National Child Survival Strategy (8). Flour fortification is also discussed in the Accelerated Development Strategy for Poverty Reduction (10) and wheat flour fortification is expected to commence in 2010 (37). Zinc is one of the nutrients currently included in the flour pre-mix at 55 ppm. The inclusion of zinc is voluntary.

Formative research, training materials, and programmes

Formative research related to zinc has not been reported in Niger.

Training materials and programmes

The national Integrated Management of Childhood Illness (IMCI) guidelines promote the use of zinc supplements in treating diarrhoea (39). In addition to

the activities of the IMCI, one other programme (40) was identified that promotes the use of zinc supplements in treating diarrhoea. The actual coverage of this programme component was not available.

Surveys, monitoring, and evaluation

There is no information on the zinc status of young children in Niger. Based on high prevalence of stunting, the International Zinc Nutrition Consultative Group estimated that Niger is at medium risk of zinc deficiency and should commence prevention programmes while conducting country specific assessments to determine the extent of zinc deficiency (41). This estimated risk of zinc deficiency is supported by the report that just 5–27% of children 6–24 months of age consumed iron-rich foods, which are generally also the best food sources of zinc, during the day prior to the survey.

There is a high prevalence of diarrhoea among young children in Niger, 31–34% of children 6–24 months reported with diarrhoea during the previous 2 weeks according to DHS 2006. We found no studies that evaluated the effectiveness or coverage of programmes integrating zinc supplements into diarrhoea treatment. Packaged oral rehydration solution (ORS) was reportedly given to just 18% of children 6–23 months who suffered diarrhoea during the 2 weeks prior to the 2006 DHS (4). Considering that diarrhoea is one of the principle causes of mortality among young children in developing countries (42, 43), effective interventions to prevent and/or treat diarrhoea remain critical in Niger's continued fight to reduce mortality.

Summary – zinc

- International estimates are that zinc deficiency is likely a public health problem in Niger, requiring intervention.
- The prevalence, risk or control of zinc deficiency among young children is not yet addressed in any national-level legislation, training document or programmes, but zinc is included as one of the fortificants recommended for flour.

- Zinc supplements are promoted in national documents for the treatment of diarrhoea, but the coverage of related programmes is not confirmed.
- The use of ORS is very low among young children with diarrhoea. Because zinc supplement therapy for diarrhoea would generally be promoted with ORS therapy, few children would have access to zinc therapy, given the current care-seeking behaviours.

Recommendations – zinc

- Efforts to include the use of zinc supplements in the treatment of diarrhoea should continue and these programmes should be evaluated to ensure they are implemented properly and that children with diarrhoea receive ORS and zinc supplements as recommended internationally.
- Given the likely prevalence of zinc deficiency among young children, there is a need for national-level activities to address the risk of zinc deficiency, such as targeted food fortification.

Iron and anaemia

National policies, strategies, and plans of action

Iron deficiency and anaemia are addressed in national nutrition legislation documents through the promotion of iron-folic acid during pregnancy, deworming during semi-annual child health days and the use of insecticide-treated bed nets (ITNs) (8, 18, 31).

Formative research

Zagr *et al.* (44) reported that among 2550 pregnant women in 78 villages studied, those who consumed multiple micronutrient supplements, including iron-folic acid, gave birth to infants with higher mean birth weights (67 g difference, $P < 0.001$) than pregnant women who consumed supplements with just iron-folic acid. Although the reported difference in birth-weight was small (67 g) the findings were highly significant, suggesting the need for further studies to confirm whether multiple micronutrients are more effective than iron and folic acid at improving birth

outcomes in this population. Efforts are on-going at the international level to provide further guidance.

Training materials and programmes

Training materials promote all of the above mentioned methods of preventing anaemia (16, 18, 20). In addition, iron-folic acid supplements are recommended in the treatment of moderately malnourished children (18). These guidelines do not yet address the possible risks of giving iron supplements to non-iron deficient young children in areas of high rates of infection, such as malaria, which is endemic in Niger (45). Several national programmes promote and distribute iron-folic acid during pregnancy, regular deworming against parasites, and consumption and production of animal-source foods that are rich in iron (20, 36, 39). The prevention of anaemia has also been promoted through smaller programmes established in various regions (14, 46).

Surveys, monitoring, and evaluation

Identified programme monitoring and evaluation reports did not inquire into whether programme components specific to iron and anaemia (iron-folic acid, ITN, deworming) were being implemented as recommended.

The DHS 2006 reported that just 5% of infants 6–9 months of age had consumed iron-rich foods the day prior to the survey, reports among older children never exceeded one-third of children. Also, although nearly half of the households surveyed had ITNs, less than 10% of women and children had used these nets the night prior to the survey and 84% of children and 46% of women had anaemia (haemoglobin $<11 \text{ g dL}^{-1}$). Further, just 14% of women consumed at least 90 days of iron-folic acid supplements during their previous pregnancy (4). These findings demonstrate that available methods of preventing anaemia are not regularly used or accessible to the target populations. The prevalence of anaemia remains high and continues to be a public health concern.

Iron deficiency was identified among ~60% of pregnant women with anaemia in the capital of Niamey, as assessed in two peer reviewed research studies (47,

48). The prevalence of iron deficiency among young children is not known. It is not clear how great the risk would be to provide iron supplements to anaemic or malnourished children in this malaria endemic country.

Summary– iron and anaemia

- Despite national-level programmes to prevent anaemia, its prevalence is very high among children and women of child-bearing age and the use of available methods of preventing anaemia, such as sleeping under bed nets or use of iron supplements during pregnancy, are used infrequently.
- The prevalence of iron deficiency anaemia is not known among young children, and iron deficiency anaemia is not distinguished from other causes of anaemia in health care settings. Iron deficiency was identified among more than half of pregnant women with anaemia in two research studies.

Recommendations – iron and anaemia

- Studies are needed to determine why available methods of preventing anaemia are not used by target populations and how best to increase their usage.
- Research into the causes of anaemia would be useful in targeting prevention programmes and determining whether iron supplements could be safely used in treating anaemia among malnourished children.
- Considering the low reported use of iron-rich foods among young children, there is a need to identify methods of improving consumption of these foods and/or identify alternative strategies. These might include the promotion of targeted fortified foods or point-of use fortificants, which are generally considered safe for use in regions where the prevalence of iron deficiency is uncertain, and delayed cord clamping at birth.

Iodine

National policies, strategies, and plans of action

The national nutrition plan of action (9) promotes universal use of iodized salt and the provision of

iodized oil to women during childbearing years. Universal use of iodized salt is also promoted in the national nutrition policy (31) and the national child survival strategy (8).

Formative research, training materials, and programmes

In a neighbourhood of Niamey, the capital of Niger, 62% of 120 women did not know what was meant by iodized salt, 48% reportedly believed they would be able to tell the difference by the colour, and 62% had no preference on the type of salt used (49). National-level training manuals and guidelines promote the use of iodized salt (16, 20, 36) and one also recommends the use of iodized oil to treat iodine deficiency symptoms (20).

Surveys, monitoring, and evaluation

The total prevalence of goitre among school-aged children was 36% in 1994 (50), and decreased to 20% in 1998, two years after commencing control of salt iodization (50). The 2006 DHS (4) reported finding adequately iodized salt (≥ 15 ppm iodine) in just 46% of tested household. We did not specifically request information on national control of imported or domestic salt, but the DHS findings indicate that these national controls are not effective at ensuring universal availability of adequately iodized salt. Alternative methods of preventing iodine deficiency might be necessary in Niger if efforts to control salt iodization continue to be sub-optimal (51).

Summary – iodine

- Adequately iodized salt is available in less than half of surveyed households and national surveys indicate that iodine deficiency is likely a public health problem in Niger.

Recommendations – iodine

- Additional support is needed for quality assurance of iodized salt to ensure that adequately iodized salt is readily available in all regions.

- In regions where iodized salt is not readily available, alternative prevention and/or treatment programmes should be considered while salt iodization controls are strengthened.

Management of acute malnutrition

National policies, strategies, and plans of action

National support for the fight against malnutrition is demonstrated in three of the seven national IYCN-related legislation documents (8, 10, 30).

Formative research

Several identified research articles evaluated aspects of malnutrition among young children. One identified survey conducted in the Tahoua region by Hampshire *et al.* (52) identified risk factors associated with malnutrition as: poor breastfeeding and complementary feeding practices, lack of appropriate health care, lack of cooperation within some family units, and lack of special care for sick children. Researchers in Niger also confirmed that the development of acute malnutrition could be slowed through use of ready-to-use therapeutic foods (RUTFs), and that malnutrition could be successfully treated in home-care and ambulatory settings (53–58).

Niger took part in an international study (59) that identified high-level coordination and support, effective training, and an effective supply chain as key determinants of success in the integration of community-based management of acute malnutrition (CMAM) into national health systems. These findings mimic those reported earlier by Aguayo *et al.* on the integration of vitamin A supplementation into national health campaigns (35).

Training materials

The recently ratified National Protocol for the Management of Malnutrition (18) includes recommendations for community-based screening and referral, and clinical management of children with moderate or severe acute malnutrition (MAM or SAM). This protocol also incorporates the use of the new WHO

Child Growth Standards as the reference in screening for low weight-for-height in diagnosing MAM and SAM. Community and clinic-based screening also incorporates the new mid-upper arm muscle circumference (MUAC) cut-off of <115 mm for SAM and between 115 and 125 mm for MAM. The protocols indicate that MUAC and/ or bilateral oedema and/ or low WHZ (weight-for-height z-score) are criteria for entering treatment programmes. However, there is some confusion, in which MUAC is only identified as a tool in screening while WHZ is used for diagnosis. In this latter case, malnourished children with low MUAC but normal WHZ would not receive required treatment.

This document also provides outdated recommendations to provide animal milk to infants who are not breastfed, but this is no longer recommended internationally.

Programmes

Reports from UNICEF representatives indicate that the number of nutrition rehabilitation centres increased substantially in response to the 2005 crisis and are now more accessible in Niger than any other country in the region. However, these centres provide treatment rather than prevention of acute malnutrition in this setting where malnutrition is a chronic problem among young children. A lipid-based nutrition supplement is being produced in Niger for use in prevention and treatment of malnutrition (personal contact with UNICEF representatives). This production shortens the required supply chain to malnutrition treatment programmes.

Surveys, monitoring, and evaluation

We identified no national reports evaluating whether programmes to manage malnutrition are functioning as desired (i.e. whether appropriate foods are available in centres, whether participants are accurately diagnosed and referred, or whether community screening is successful at identifying malnourished children). However, the 2007 evaluation of the integration of CMAM into health systems, mentioned earlier (59), identified several weaknesses in the Niger CMAM

programme. These included that the supply chain was mainly supported by outside agencies (NGOs and UNICEF), pre- and in-service training among all levels of health care providers was inadequate to support programme activities, and links between inpatient and outpatient care were poorly established. Although this report was specifically for response to nutrition crises among CMAM facilities, the findings are useful for directing the management of other levels of malnutrition care. The status of these programme activities should be evaluated in other malnutrition programmes for use in improving outcomes.

Summary of findings – management of acute malnutrition

- Despite national and international activities to fight acute malnutrition, the prevalence has remained stagnant since the early 1990s and climatic crises continue to contribute to this problem.
- Nutrition rehabilitation centres are more accessible in Niger than in other countries of the Sahel region, but reports have identified gaps in local capacities to support the integration of CMAM activities into these centres.

Recommendations – management of acute malnutrition

- National and international efforts are needed to expand human and institutional capacities to address the population's needs to treat acute malnutrition.
- These efforts must coincide with the activities described above to prevent malnutrition through improved feeding practices and prevention of micronutrient deficiencies, in addition to ensuring household food security and proper hygiene that will be discussed briefly in the following.
- There is a need to improve programme monitoring and evaluation to identify gaps in essential activities and then apply required changes to achieve desired outcomes.

Prevention of mother-to-child transmission of HIV

Identified national policies, training materials, and programmes address the need to manage HIV and

other sexually transmitted diseases and to prevent the mother-to-child transmission of HIV in general. We did not have access to the nutrition guide for people living with HIV to confirm whether it included guidelines for preventing the transmission of HIV from the mother to her child.

The prevalence of HIV among adults 15–49 years nationally is <1% (4). The DHS 2006 (4) reported that 53% of women surveyed were aware that HIV could be transmitted by breast milk but only 16% were aware that the transmission from mother-to-child could be decreased by taking anti-retroviral therapy (ART) medication. Nearly all infants in Niger are breastfed and very few are exclusively breastfed during the first 6 months of life. Therefore, the promotion of exclusive breastfeeding is also an important strategy in the effort to reduce the vertical transmission of HIV. This is particularly true in areas where HIV testing is low, precluding HIV detection and thus ART.

Recommendations – prevention of mother-to-child transmission of HIV

- Based on the findings of national surveys, additional support is needed to improve education on HIV and how to reduce transmission from HIV positive mothers to their children.
- Appropriate national nutrition policies, training materials, and programme documents may need to be updated to include the current recommendations for selecting the optimal feeding choice for infants and children of HIV positive women (60), and the appropriate use of ART to prevent transmission from mothers to infants (61).

Food security

National policies, strategies, and plans of action

Food security activities have increased since the 2005 crisis and continue to provide assistance to alleviate the effects of more recent food crises. National nutrition policies and strategies (9, 10, 31) these activities and a separate national food security strategy ('Stratégie Opérationnelle de Sécurité Alimentaire pour le Niger') were described in reviewed

documents but this latest strategy document was not available for review.

Formative research

One identified study evaluated the impact of possible programme interventions to reduce the effects of food insecurity by providing three cash transfers of 20 000 F CFA (~\$40) each to caregivers of children <5 years in very low income households in southern Niger (62). The cash transfers occurred across the lean to early harvest seasons. In a representative survey of 100 of the 1500 recipient households, the prevalence of malnutrition decreased among young children during this period when the prevalence of malnutrition typically increases (no control group evaluated). At baseline, household dietary intakes only met 84% of caloric requirements and just 54% of households could add milk to enrich young children's porridge. Following the intervention, 105% of caloric needs were reached and 80% of households were adding milk to children's porridge (standard errors not reported). In addition, the amount of nutrient-rich foods purchased, such as cowpeas, curdled milk, and meat increased more than 3-fold between baseline and the final cash transfer. A notable finding was that these cash transfers were less expensive than typical food distribution programmes in this region. The authors suggested that supplementary foods or micronutrient supplements might still be necessary to bridge the gap between micronutrient intakes and requirements for young children, but this was not confirmed through the present evaluation.

Training materials and programmes

We did not specifically request protocols or training manuals for food security programmes, but food security is addressed through promotion of good agricultural practices in a community nutrition programme (20), and the promotion of home gardens in targeted programmes that followed the 2005 crisis (63, 64) and some that started before 2005 and continue (26, 32, 65). The community nutrition programme is intended to be implemented nationally, and the gardening projects were implemented across various regions, mostly in the Diffa, Dosso, Tahoua, and Zinder regions where food insecurity is the most prevalent.

Surveys, monitoring, and evaluation

Food security and vulnerability are evaluated through regularly conducted national or nearly national surveys (66–68) but we found no evaluations of the programmes, just mentioned. National surveys are used to target nutrition and other food security programmes in the most vulnerable regions of Niger. However, the indicators are not necessarily presented the same in each survey so time trends are not always possible to track.

The FEWS NET mapping tool is currently used to map regional-level data (68). If the information could be disaggregated to the district or health department level an instrument such as this could be used to track training, supervision, programme implementation, and outcomes.

Summary – food security

- Household food security is supported among vulnerable households through food distribution, agricultural support and some cash transfer activities.
- The chronic nature of food insecurity in Niger is likely a contributing factor in the lack of change in the prevalence of malnutrition among young children.
- A promising cash transfer programme reported reductions in the gap in household food purchases during the lean season and was reportedly lower cost than food distribution would have been in the area studied.

Recommendations – food security

- A detailed review of the impact of available gardening and other food security programmes should be conducted to determine which single or combination of activities would best address the chronic food insecurity in at-risk populations.
- Food security tracking should be improved by harmonizing methods of collecting data and key indicators used across surveys. This might also include the use of mapping tools, such as the tool used by FEWS NET or a more detailed version of such a tool.

Personal, food, and environmental hygiene

National policies, strategies, and plans of action

The importance of proper hygiene in health and nutrition is recognized through several national policies and strategies (8, 10, 31).

Formative research, training materials, and programmes

One research article reported that poor hand washing techniques were a more important cause of intestinal parasitic diseases in one neighbourhood in Niamey, the capital of Niger, than poor drinking water (69). Proper techniques in hand washing and food preparation and storage are promoted in national-level nutrition guidelines (16, 21). The national protocol for the use of zinc in treating diarrhoea also promotes safe food practices to avoid contamination and thus diarrhoea. More detailed guidelines and programmes may be available in programmes which were not specifically oriented to young children.

Surveys, monitoring, and evaluation

The DHS/MICA 2006 reported that 41% of the population had access to improved water sources nationally and just 8% had access to improved systems of disposing human wastes (toilet, covered or open latrines). This survey did not report data such as the use of hand soap or reasons for such limited access to disposal systems, which would be useful in developing educational messages and effective interventions. We found no evaluations of whether the hygiene promotion component of nutrition programmes was being implemented or whether there was any impact on hygienic practices in response to this or any other related programme. Considering the high rates of diarrhoea among young children, as reported in the most recent DHS (4), and the link between hygiene and diarrhoea, improved hygienic practices are likely to have an important impact on improving the health and well-being of young children in Niger.

Recommendations – hygiene

- The reported low use and availability of methods of improving hygiene indicates there is a need for

increased promotional activities, such as the international WASH approach (70), to maximize use of available resources. There is also a need for improved infrastructure to increase access to potable water and appropriate methods of disposing of human wastes.

General findings

Documentation

Several legislative, training and programme documents were not available for review (see online supplementary data for missing documents), highlighting the need for a central repository of such documents to facilitate accessibility. The training materials reviewed were all for in-service training. We did not have access to any training materials intended for pre-service use, such as in universities or technical schools, but key informants reported that a nutrition training programme has commenced.

BCC and IEC

BCC and IEC are key components of the activities promoted through the recently ratified Child Survival Strategy (2008), the ENA approach, and several other training and programme documents which are intended for national and smaller-scale use. These documents specify contact points at which key health and nutrition education should occur. Discussion with key informants indicates that human capacities are not sufficient to support appropriate BCC/IEC approaches at the community and health centre level. Although the ENA provides guidance on individual counselling techniques to maximize information dissemination and adoption by participants, this guide gives little information on developing group-interventions. Given limited human resources, group education may be the most appropriate current platform for nutrition message dissemination.

Summary

Niger is on track to achieving the MDG 4.1 of reducing mortality by two-thirds by 2015 among children less than 5 years of age. This reduction occurred as

vitamin A supplementation campaigns increased coverage, but no direct impact evaluations were conducted. Mortality rates are still very high, requiring sustained support to continue reducing these high rates of mortality beyond the MDG. In contrast to this reduction in young child mortality, rates of malnutrition among young children remain very high.

National legislation and programmes clearly promote most of the key infant and young child nutrition practices and related activities, but few programmes have reached national coverage. The prevalence of optimal breastfeeding and complementary feeding practices remain low. Research and programme monitoring and evaluation are inadequate to confirm whether: (i) training is adequate; (ii) programmes are correctly implemented; (iii) beneficiaries are receiving appropriate services, including educational activities pertinent to their situations; (iv) participants implement desired practices; and (v) these efforts result in improved nutritional and health status of infants and young children. Further, there is little or no information on current status of micronutrient deficiencies and the impact of programmes for screening and preventing malnutrition. Therefore, it has been difficult to identify effective programmes for expansion. Researchers and key informants have identified gaps in human and institutional capacities to carry out some of the nutrition programmes in Niger. Therefore, even when effective programmes are identified, it may not be possible to expand them as required until these capacities are also expanded.

Two national evaluations of the successful integration of VAS and malnutrition programmes into other health sector programmes (35, 59) reflect the international findings related to the success of scaling up breastfeeding programmes (71). The identified characteristics of these programmes include: ownership and collaboration at all levels, including politicians, implementers, communities, and recipients; flexibility in adapting programmes and supply chains to local needs; promotion of the programme through a variety of communication channels; the use of very clear and memorable messages, and effective staff training.

Despite considerable national and international nutrition interventions in Niger, and substantial reductions in mortality rates among young children,

there is still much to do. Human capacities, and supporting institutional capacities, must be developed to support the implementation and surveillance of effective nutrition and food security programmes to prevent malnutrition and improve infant and young child nutrition in Niger.

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Supporting information

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Appendix S1. Tables and lists of documents

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