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Research priorities for improving infant and young child feeding in humanitarian emergencies

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Abstract

Background: There are many challenges during emergencies to ensure that optimal infant and young child feeding is protected, promoted and supported, but there is a dearth of evidence on strategies and programmes to improve Infant and Young Child Feeding in Emergencies (IYCF-E) and a need to determine research priorities.

Methods: Based on interviews with key informants who are experts in the subject, we developed a list of 48 research questions on IYCF-E. A framework, following the Child Health and Nutrition Research Initiative method to set priorities in child health research, was developed to rank the research questions. Four criteria were applied to create a ranking based on answerability, operational relevance, disease burden reduction and prevention, and originality. Using an on-line survey, prioritisation of research questions was done by 27 people from 14 NGOs, universities and research institutions, and UN organisations.

Results: The top-ten research questions identified focused on the following:

- Use of cash-transfer to buy breast-milk substitutes;
- Effectiveness of complementary feeding strategies;
- Long-term effect of IYCF-E interventions;
- Design of IYCF-E programmes in a context where breastfeeding rates are low and breast milk substitutes use is high;
- Design of effective re-lactation interventions;
- Provision of psychological support to young children's care-takers;
- Determination of number of beneficiaries and coverage of IYCF-E programmes;
- Pros and cons of distributing ready-to-use infant formula compared with distributing powdered infant formula plus kit for safer use of BMS, when use of infant formula is necessary;
- Assessment of the impact of specific IYCF-E programmes on nutritional status, morbidity and mortality;
- Linking and mainstreaming IYCF-E interventions with other sectors such as health, WASH, food security and child protection.

Conclusion: The questions found by this study could form the basis of future research on IYCF-E and could be integrated into the agenda of relevant stakeholders. Results of studies based on these questions will be fundamental to fill the evidence gap in IYCF-E, improve IYCF-E programming and ultimately contribute to the reduction in morbidity and mortality among infants and young children in humanitarian emergencies.

Keywords: Breastfeeding, Infant and young child feeding, Humanitarian emergency, Nutrition, Research priorities

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Background

Humanitarian emergencies affect millions of people each year. In 2014, an estimated 141 million people were affected by natural disasters and 59.5 million were forcibly displaced by violence and conflict [1].

On the other hand, breastfeeding is the single most effective intervention to save children's lives and could prevent 13 % of all deaths among children less than five years if practiced optimally, while good complementary feeding could prevent another 6 % of deaths [2]. The recommendations for optimal infant and young child feeding practices include starting breastfeeding within an hour of birth; exclusive breastfeeding for the first 6 months of life; continued breastfeeding for at least 2 years; and introduction of nutritionally-adequate and safe complementary (solid) foods at 6 months together with continued breastfeeding up to 2 years of age or beyond [3]. However the latest *Countdown to 2015* report highlights that, according to surveys in around 50 countries, only 50 % and 39 % of mothers reported early initiation of breastfeeding and exclusive breastfeeding for 6 months, respectively, and 67 % recounted adequate timing of introduction of complementary feeding [4].

In addition to the already poor infant and young child feeding practices in normal circumstances, there are further challenges during emergencies to ensure that optimal infant and young child feeding is protected, promoted and supported. These include environmental factors, misconceptions about breastfeeding, inappropriate feeding prior to and during disasters, food insecurity hampering the procurement of nutritious food, competing household needs, and psychological trauma that affects child care practices [5]. Moreover, donations of breast-milk substitutes (BMS) and non-targeted distributions of BMS to non-breastfed children might also interfere with and undermine breastfeeding.

Not breastfeeding exposes a child to a greater risk of infectious diseases such as diarrhoea. For example, after the earthquake in Yogyakarta, Indonesia in 2006, a study found that rates of diarrhoea doubled among infants who had been given donated infant formula compared with those who had not [6]. During the floods in Botswana in 2006, infants hospitalised with diarrhoea were 30 times more likely not to be breastfed compared with infants without diarrhoea [7].

Most of the evidence about the effectiveness of interventions aimed at improving breastfeeding and complementary feeding has been obtained in non-emergency settings and there is a dearth of data during emergencies. A review of research on health interventions in humanitarian crises concluded that more evidence is required on the impact of infant and young child feeding interventions in emergencies (IYCF-E) [8]. Another paper recently pointed out that "Some elements of emergency

responses promoted by the international community have so far received too little study and require empirical study, including the effectiveness of various recommendations on infant and young child feeding approaches in emergencies" [9]. Moreover a review of IYCF-E involving several humanitarian stakeholders highlighted the needs for evidence-based programmes [5].

As a first step towards filling these gaps, we aimed to develop and prioritise a list of research questions on IYCF-E.

Methods

We used the Child Health and Nutrition Research Initiative (CHRNI) systematic method for setting priorities in child health research [10] and adapted it to the specific context. The CHRNI framework not only aims at creating novel knowledge, but also emphasises the importance of implementation and the better application of current knowledge.

Context

We defined the context as follows:

Space. Complex humanitarian emergencies defined as acute or chronic situations of conflict, war or civil disturbance, natural disasters, food insecurity or other crises that affect large civilian populations that result in significant excess mortality, and are beyond the capacity of the local government to cope [11].

Time. Next 10 years, so 2015 to 2025.

Target population. Children 0–24 months and their caregivers.

Target disease burden. Mortality, morbidity and malnutrition resulting from poor infant and young child feeding in emergencies.

IYCF-E is concerned with interventions to protect, promote and support safe and optimal feeding practices for both breastfed and non-breastfed infants and young children [12]. It involves: 1. Appropriate policies; 2. Trained staff; 3. Co-ordinated responses; 4. Assessment and monitoring; 5. Integrated multi-sectoral response; 6. Minimising the risk of any artificial feeding.

Development of research questions

We conducted semi-structured interviews with key informants who are experts in the domain of IYCF, including representative of Non- Governmental Organisations (NGOs), United Nations (UN) agencies, donor agencies and research institutions. Respondents were selected based on their current or past involvement in IYCF-E from an implementation, coordination, policy or academic perspective in various geographical areas, including Africa, Asia, the Caribbean and the Middle East. They were identified through an existing coordination

body, the Infant and Young Child Feeding in Emergencies Core Group (IFE Core Group), by participation in key workshops on IYCF-E, and by recommendation of the interviewees. The interviews and this snowball selection continued until no more respondents were identified. Interviews were held in person and/or using Skype, and encompassed discussion about the main gaps in evidence in the field of IYCF-E; the most important research questions; and the current involvement of the interviewee or institution in IYCF-E interventions and research. Research questions were then developed on the basis of the themes arising from interviews. We amalgamated all interrelated research ideas and edited the questions to keep them as few in number as possible and to make them comprehensible.

Categorisation of research questions

Each question was classified according to the following categories of health research:

- Basic epidemiological and biological research which aims to define the disease burden, its components, the relative risks of different underlying factors, and the effectiveness of the interventions available. This was divided into two components:
 - Measuring the burden
 - Understanding risk factors
- Policy and systems research which seek to reduce the burden of disease by improving the efficiency of health and humanitarian systems in delivering the interventions. This was divided into two components:
 - Capacity to reduce exposure
 - Capacity to deliver effective interventions.
- Improving existing interventions and developing new interventions which was divided into four components:
 - Evaluating existing interventions
 - Capacity building
 - Programme design and implementation
 - Technical questions.

Ranking of research questions

A framework following the CHRN method was developed to allow the key informants to rank the research questions using a set of pre-defined ranking criteria.

Based on CHNRI's conceptual framework and on similar exercises to prioritise research questions on the

improvement of the management of acute malnutrition in infants aged less than six months [13] and to prioritise research questions on neonatal survival in complex emergencies [14], we defined four judging criteria for ranking the IYCF-E questions:

1. Answerability: likelihood that research would lead to new knowledge in an ethical way;
2. Operational relevance: likelihood that research would address critical gap in knowledge and could be readily translated to inform policies and programs, including assessment of needs, strategy and programme planning, programme implementation, monitoring and evaluation;
3. Disease burden prevention and reduction: likelihood that research would eventually contribute to a significant prevention or reduction in mortality, morbidity and malnutrition resulting from poor infant and young child feeding practices;
4. Originality: likelihood that research will generate novel findings or methods.

Survey

An online survey was developed using LimeSurvey 2.05+ (LimeSurvey Project Team / Carsten Schmitz 2015) and tested by individuals who were aware of the subject but not involved in the development or the ranking of the questions.

Table 1 shows the survey questions for the four ranking criteria. For each research question, respondents had four possible responses: yes (1 point); no (0 point); undecided (0.5 point); and insufficiently informed (considered missing). An answer was compulsory for all judging criteria for all research questions. The survey was open between 16 December 2014 and 5 March 2015. Participants were drawn from the list of interviewees but, due to time constraint and in order to achieve a high response rate, it was restricted to people affiliated to Save the Children, the IFE core group, and universities actively involved in IYCF-E research.

Analysis

A priority score was calculated as follows for each research question. For each judging criterion, the sum of the points for all the answer of each individual were calculated and an overall score calculated as the percentage of maximum number of points, excluding from the denominator any answer that was not sufficiently informed. For each question, the overall research priority score was calculated as the mean of the overall scores of each judging criteria, as calculated above. Research questions were ranked from 1 for the highest score to 48 for the lowest score, both for the overall research priority score and for each judging criteria.

In addition, the agreement between scorers was calculated for each research question as follow:

$$\text{Agreement} = 1 / \sum_{k=1}^4 \frac{\text{Number of scorers providing the most frequent response (i.e yes, no or undecided)}}{\text{Number of scorers providing a response}}$$

With k = judging criteria

Research questions were ranked from 1 for the highest agreement score to 48 for the lowest agreement score.

Microsoft Excel (2010) was used to analyse the data.

Results

To develop the research questions we interviewed 46 people: 27 people representing 14 NGOs, 5 people representing 4 UN agencies, 4 donors representing 4 agencies and 10 people representing 9 research institutions. Saturation was attained since no new information emerged from the last people to be interviewed. Interviews could not be arranged with two people initially contacted. Forty-eight IYCF-E research questions were developed from the interviews. Most of them (56 %) were classified in the research category of “existing and new interventions”, especially for the research components “evaluating interventions” (9 questions) and “programme design and implementation” (13 questions). Eleven (23 %) and 10 (21 %) questions concerned “policy and systems” and “basic epidemiology” (Additional file 1).

The on-line survey to prioritise IYCF-E research questions was answered by 27 of the 34 people who received the survey. The overall response rate was 79 %, including 100 % response rate from Save the Children staff (13 people), 77 % response rate from the IFE Core Group (10 people) and 50 % response rate from academics who were not members of the IFE Core Group (4 people). The responders represented 8 NGOs, 2 UN organisations and 6 research institutions.

The overall scores were generally high and ranged from 86.2 for the question ranked 1, to 65.5 for the question ranked 48th (Additional file 1). The number of responses “not sufficiently informed” was generally low with median and rank of 1 (0–10) for answerability, 0 (0–5) for operational relevance, 1 (0–6) for disease burden and 1 (0–7) for originality. Agreement was generally good: median agreement score was 69.9, ranging from 51.7 to 80.1.

The top ten research questions comprised questions essentially pertaining to the research category “existing and new interventions” with 8 questions selected from a total of 27 questions in this group (30 %) (Table 2). Only one question out of 10 (10 %) of the research category “basic epidemiology” and one out of 11 (9 %) of the category “policy and systems” were ranked in the first 10 research questions. The ranks of the four judging criteria, i.e., feasibility, operational relevance, disease burden prevention and reduction, and originality, varied widely from 3 to 42, 1 to 40, 1 to 29 and 1 to 37, respectively (Table 3). Agreement was high for the top 10 questions, ranging from 80.1, corresponding to rank 1 for agreement, to 70.4, corresponding to rank 19 (Table 2).

Among the 10 research questions which received the lowest scores, four were from the “policy and systems” category (4 of 11 questions, 36 %), 5 were from “existing and new interventions” (5 of 27 questions, 19 %) and 1 was from basic epidemiology (1 of 10 questions, 10 %) (Table 4).

Table 1 Ranking criteria and questions for infant and young child feeding in emergencies research prioritisation

Criteria	Question
Answerability	Would you say that a study to answer this research question is possible (e.g., feasible, ethical, sufficient statistical power achievable and well defined endpoints/outcomes)?
Operational relevance	Would you say that the outcome of this research question will bring new crucial evidence for improvement of one or several of the following components: assessment of needs, strategy and programme planning, programme implementation, monitoring and evaluation?
Disease burden reduction and prevention	Would you say that interventions arising from the research would eventually contribute to a significant prevention or reduction in mortality, morbidity and malnutrition resulting from poor Infant and Young Child Feeding in emergencies in the short and long term, given the humanitarian context?
Originality	Would you say that the study will generate novel findings or that the methods to answer the research question will be original?

Table 2 Priority and agreement scores for the ten highest ranked research questions on Infant and Young Child Feeding in Emergency (IYCF-E)

Research instrument	Research questions	Priority rank	Priority score	Agreement rank	Agreement score
Research on existing and new interventions	To what extent is cash transfer used to buy breast milk substitutes?	1	86.2	1	80.1
Research on existing and new interventions	What are the effectiveness and cost-effectiveness of different complementary feeding interventions per se and comparatively, i.e., distribution of different food supplements, such as blended foods, ready to use foods, micro-nutrient powders, fresh foods; cash transfer; and vouchers assistance in different contexts, on IYCF-E practices, nutritional status and morbidity?	2	83.3	13	73.3
Research on existing and new interventions	What is the long term effect of IYCF-E interventions, such as baby tents after major natural disasters and IYCF component of CMAM programmes, on IYCF practices of caretakers enrolled in the interventions, e.g., feeding colostrum, exclusive breastfeeding up to six months, dietary diversity for children more than 6 months?	3	83.2	19	70.4
Research on existing and new interventions	In context where pre-emergency breastfeeding rates are low and breast milk substitutes use is high, how to effectively design IYCF-E programmes: at the same time as protecting, promoting and supporting breast-feeding, what is the most effective mechanism for supplying breast milk substitute (either in kind, through voucher assistance or cash transfer), and how can it be best managed?	4	82.9	12	73.4
Research on existing and new interventions	How to design re-lactation interventions and what are their effectiveness and cost-effectiveness on re-lactation rate?	5	82.5	9	73.5
Research and existing new interventions	How to provide effective psychological support to caretakers of infant and young children in different contexts, e.g., presence or absence of qualified staff?	6	82.4	6	76.9
Basic epidemiological research	How to determine the number of potential beneficiaries and the coverage of IYCF-E programmes?	7	82.3	4	77.1
Research on existing and new interventions	When use of infant formula is necessary what are the pros and cons, e.g., safety, timeliness, and cost-effectiveness of distribution of ready to use infant formula compared to distribution of powdered infant formula plus kit for safer use of BMS, on nutritional status and morbidity?	8	82.3	2	77.6
Research on existing and new interventions	How to calculate, e.g., by mathematical modelling, the impact of specific IYCF-E programmes on nutritional status, morbidity and mortality?	9	81.9	10	73.5
Policy and system research	How to effectively link and mainstream IYCF-E interventions with other sectors such as health, WASH, food security and child protection?	10	81.7	7	75.5

Discussion

This analysis indicates that the main gap in evidence on IYCF-E relates to programme implementation, including programme design and evaluation of interventions, as indicated by both the prominence of this topic in the research questions derived from interviews with key informants, and its prominence in the highest ranked research questions. However this could be due to the large number of operational staff included in the survey, compared with the smaller number of academics.

The top 10 research questions embraced both interventions to protect and promote breastfeeding as well as to improve complementary feeding. The former included the design of effective re-lactation interventions and the long-term effect of IYCF-E interventions on children. Although

there is good evidence that re-lactation works for women in both developed and developing countries [15–17], there is only anecdotal evidence of success of programmes aimed at re-lactation during emergencies and there are no publicly available guidelines. Some guidance gives general principles but no practical application for actual implementation of programmes [12, 18]. The global long-term positive effects of breastfeeding, including increase in cognitive performance, and possible reduction in overweight and diabetes have been well documented [19]. However, long-term effect of breastfeeding might be different in emergency contexts where children are exposed to a series of hazards.

Questions on the effectiveness of complementary feeding strategies reflect the fact that the effectiveness of different complementary feeding interventions to prevent wasting

Table 3 Scores for judging criteria for the ten highest ranked research questions on infant and young child feeding in emergencies (IYCF-E)

Research instrument	Research questions	Feasibility rank (score)	Operational relevance rank (score)	Disease burden rank (score)	Originality rank (score)
Existing and new interventions	To what extent is cash transfer used to buy breast milk substitutes?	3 (92.3)	10 (88.9)	29 (79.6)	4 (84.0)
Existing and new interventions	What are the effectiveness and cost-effectiveness of different complementary feeding interventions per se and comparatively, i.e., distribution of different food supplements, such as blended foods, ready to use foods, micro-nutrient powders, fresh foods; cash transfer; and vouchers assistance in different contexts, on IYCF-E practices, nutritional status and morbidity?	31 (74.1)	2 (94.4)	2 (92.6)	15 (72.0)
Existing and new interventions	What is the long term effect of IYCF-E interventions, such baby tents after major natural disasters and IYCF component of CMAM programs, on IYCF practices of caretakers enrolled in the interventions, e.g., feeding colostrum, exclusive breastfeeding up to six months, dietary diversity for children more than 6 months?	32 (74.0)	20 (86.5)	3 (90.4)	5 (82.0)
Existing and new interventions	In context where pre-emergency breastfeeding rates are low and breast milk substitutes use is high, how to effectively design IYCF-E programs: at the same time as protecting, promoting and supporting breast-feeding, what is the most effective mechanism for supplying breast milk substitute (either in kind, through voucher assistance or cash transfer), and how can it be best managed?	34 (73.1)	6 (90.7)	24 (80.8)	2 (87.0)
Existing and new interventions	How to design re-lactation interventions and what are their effectiveness and cost-effectiveness on re-lactation rate?	15 (83.3)	40 (78.8)	24 (80.8)	2 (87.0)
Existing and new interventions	How to provide effective psychological support to caretakers of infant and young children in different contexts, e.g., presence or absence of qualified staff?	9 (86.0)	10 (88.9)	10 (86.0)	19 (68.8)
Basic epidemiological research	How to determine the number of potential beneficiaries and the coverage of IYCF-E programs?	4 (90.7)	1 (98.1)	7 (88.5)	37 (51.9)
Existing and new interventions	When use of infant formula is necessary what are the pros and cons, e.g., safety, timeliness, and cost-effectiveness of distribution of ready to use infant formula compared to distribution of powdered infant formula plus kit for safer use of BMS, on nutritional status and morbidity?	10 (85.2)	17 (87.0)	12 (84.6)	13 (72.2)
Existing and new interventions	How to calculate, e.g., by mathematical modelling, the impact of specific IYCF-E programs on nutritional status, morbidity and mortality?	42 (67.6)	34 (81.3)	9 (86.4)	1 (92.5)
Policy and system	How to effectively link and mainstream IYCF-E interventions with other sectors such as health, WASH, food security and child protection?	25 (76.9)	3 (92.6)	1 (96.2)	27 (61.1)

and stunting, such as the distribution of food supplements and/or transfers of cash, is globally high on the agenda of the humanitarian nutrition community at the moment but with no clearly definitive results yet on their nutritional impact and benefit [20]. Recent research projects have been initiated to further explore this matter [21].

The ability of mothers to care for children in highly challenging humanitarian situations in which caretakers are exposed to stress and trauma was also a main concern. The line of interrogation relied especially on how to provide effective psychological support to caretakers

in absence of skilled staff. WHO has initiated a series on low-intensity psychological interventions [22]. The integration of some of those interventions with IYCF-E programmes and the evaluation of their effectiveness on care-taker's and child's well-being would permit an advance in this area.

The design of adequate responses in emergency contexts in which the use of BMS was common also stood out as one of the major areas needing research, with three out of ten questions related to this issue: the design of IYCF-E programmes in these contexts; the extent

Table 4 Priority and agreement scores for the ten lowest ranked research questions on infant and young child feeding in emergencies (IYCF-E)

Research instrument	Research questions	Priority rank	Priority score	Agreement rank	Agreement score
Existing and new interventions	As cup feeding presents many challenges, are there ways to improve cup feeding technique or to develop a new technique?	38	70.6	42	57.3
Existing and new interventions	How long can expressed breast milk be kept without refrigeration in different climate conditions, i.e., temperatures and humidity, in terms of micro-biological safety, micro-nutrient contents and protective factors?	39	70.5	45	55.8
Policy and system	How to scale-up small effective IYCF-E programmes?	40	70.3	37	61.5
Policy and system	How to use effectively available evidence to package advocacy messaging on the importance of protecting IYCF in emergencies by implementing and sustaining IYCF-E interventions?	41	69.3	43	56.0
Existing and new interventions	How to estimate the needs for breast milk substitutes and engage with private sector to supply generic breast milk substitute that is Code compliant?	42	69.1	46	55.0
Existing and new interventions	What are the feasibility, achievable goal and effectiveness of different IYCF-E interventions per se or combined, e.g., mass communication, baby-friendly tents, support group at distribution points or in the community, individual counselling, within different phases of an emergency, and different contexts, on IYCF-E practices, nutritional status and morbidity?	43	68.9	33	62.4
Basic epidemiological research	What is the relation between breastfeeding and, wasting, stunting and enteropathy?	44	68.7	44	55.8
Policy and system	How to build capacity in IYCF-E at local, national and international level?	45	68.6	28	66.0
Policy and system	What has been the impact of governments' and international organizations' level of engagement on success or failure of IYCF-E programming in past emergencies?	46	68.6	40	58.1
Existing and new interventions	How to measure feeding practices beyond mother interviews to overcome the risk of reporting bias?	47	68.0	41	58.0
Existing and new interventions	When feeding at the breast is not possible, what is the feasibility and effectiveness of using disposable bottles?	48	65.5	48	51.7

of the use of cash transfers to buy breast-milk substitutes; and the pros and cons of distributing ready-to-use infant formula compared with powdered infant formula plus kit for safer use of BMS if use of BMS is necessary. This recognises the current challenges faced by humanitarian organisations in emergency contexts such as the Syria and Ukraine crises. There would be a good opportunity to further evaluate effectiveness of IYCF-E programmes in these crises. Along these lines, new interim operational guidance has been released for the feeding support of infants and young children in refugee and migrant transit settings in Europe [23] and is currently under evaluation.

Finally, questions focused on evaluating the impact of interventions, such as estimating the coverage of IYCF-E programmes and the impact of specific IYCF-E programmes on nutritional status, morbidity and mortality, were also judged highly. Although effectiveness of breastfeeding interventions has been largely demonstrated in non-emergency contexts [24], there is a dearth of evidence

in emergency contexts where populations and programme implementation are faced with specific challenges. Only 4 % of published papers and grey-literature investigating nutrition interventions in emergency between 1980 and 2013 assessed IYCF-E interventions [8]. Impact evaluation is not only central to evaluating programme impact and for accountability, but also to convince donors of the crucial needs for IYCF-E programmes. Indeed, nutrition programmes in emergency contexts tend to focus on the management of acute malnutrition rather than on protecting and improving IYCF practices.

To our knowledge, this paper is the first to identify, rank and extensively describe major research topics on IYCF in emergencies, a neglected and difficult theme to work in. Some of the research questions described had a narrow scope and could be answered with limited resources, such as a literature review or secondary data analysis, while others would require substantial primary data collection at considerable cost. Our analysis complements a similar exercise conducted recently focusing

on the management of acute malnutrition in infants less than 6 months [13] but had a wider focus to include both non-malnourished children and children from birth to 2 years.

The study had some limitations. First, some reporting bias might have occurred when the questions were written from the interviews with miss-interpretation of the notions expressed by the interviewees. However, to minimise this risk, discussions were held to clarify any imprecise points during the interviews. Interviews were also recorded.

Second, there might also have been some selection bias arising from the choice of survey respondents. We decided to share the survey with a limited number of known experts in the field to maximise the response rate rather than to open the survey to a wider group, who might have been less motivated to respond. The results and findings therefore only represent the views of a restricted number of people chosen for their expertise but the response rate was good so the results are representative of the group itself. In addition, those people are the key experts in the domain and represent prominent NGOs, the major UN agencies and academic institutions, giving credibility to the results of the study. However, no representatives of governments or affected communities, who might have had a different point of view, were involved in the study. Before undertaking a research project derived from the research questions, it would be advisable to seek government and community representatives' point of view to complement this study.

Third, the number of respondents from Save the Children was high and this might have biased the results towards the views of this organisation. Agreement scores were, however, high. Moreover there was concordance between the responses of Save the Children staff and the staff of those other organisations (data not shown).

Fourth, no weighting was applied to the four judging criteria, which is different to the CHRNI method. No participants suggested weighting, and the authors of the paper deemed all judgement criteria to be of equal worth. The data can still be re-analysed using a weighting system at a future stage.

Finally, some research questions have a wide scope and more precise questions will need to be defined before a research project can be undertaken.

Conclusion

This study provides an insight into the scope and perceived importance of research questions on IYCF-E by experts in the subject. These questions could form the basis for future research on IYCF-E and could be integrated into the research agenda of stakeholders. The results of studies based on these questions will be

important to fill the evidence gap in IYCF-E, to improve IYCF-E programming and, ultimately, to contribute to a reduction in morbidity and mortality among infants and young children.

Additional file

Additional file 1: Priority and agreement scores and ranking for research questions on Infant and Young Child Feeding in Emergency. (IYCF-E) (XLSX 20 kb)

Abbreviations

BMS: Breast-milk substitutes; IYCF-E: Infant and young child feeding interventions in emergencies; CHRNI: Child health and nutrition research initiative; NGOs: Non- Governmental Organisations; UN: United Nations; IFE Core Group: Infant and Young Child Feeding in Emergencies Core Group.

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Availability of data and materials

All the data supporting our findings is contained within the manuscript and additional file.

Authors' contributions

CP conducted interviews. CP, AH, AM, JF, PB and PH designed the survey framework. CP, AH and AM wrote the research questions. CP, JF and PB participated in the set-up of the online survey. CP analysed the data. CP wrote the first draft of the paper and all authors revised the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no financial or non-financial competing interest.

Consent to publish

Not applicable.

Ethics and consent

As is standard for the CHNRI methodology that we have used, formal ethics review was not needed because the study did not involve any personal or sensitive data. Moreover, the study did not implicate patients but professional participants that were solicited via professional networks. Interviewees were informed that their responses would be utilised for research and publication. Individual answers are not shown and remain anonymous.

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