

Original Article

Complementary feeding practices in South Asia: analyses of recent national survey data by the South Asia Infant Feeding Research Network

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Abstract

South Asian region has the highest global burden of child undernutrition, with almost 41% of children stunted, 16% wasted and 33% underweight. Improved feeding of children less than 2 years of age is particularly important because they experience rapid growth and development, and are vulnerable to illnesses such as acute respiratory infections and diarrhoeal diseases. The present supplement aimed to describe complementary feeding practices in five South Asian countries – Bangladesh, India, Nepal, Pakistan and Sri Lanka – using the new and updated global complementary feeding indicators and to identify determinants of inappropriate complementary feeding practices. The South Asia Infant Feeding Research Network held a series of workshops to study and discuss the operational guidelines for the new complementary feeding indicators in consultation with regional and international experts. The latest Demographic and Health Surveys for Bangladesh, Nepal, Pakistan and Sri Lanka, and the National Family Health Survey of India were used as data sources. Four key indicators were calculated: introduction of solid, semisolid or soft foods in 6–8 months aged, minimum dietary diversity, minimum meal frequency and minimum acceptable diet in 6–23-month-aged children. Univariate and multivariate logistic regression analyses were performed to identify determinants of poor complementary feeding practices. The papers in this supplement present results of these analyses for each individual country and a comparison between countries. The results have important implications for policies, programmes and research on infant and young child feeding in the region, especially for targeting groups at high risk for suboptimal practices.

Keywords: infant feeding, child feeding, infant feeding behaviour, complementary feeding, complementary foods, dietary patterns, South Asia.

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What is complementary feeding?

Complementary feeding is defined as the process starting when breast milk alone or infant formula alone is no longer sufficient to meet the nutritional requirements of infants, and therefore, other foods and liquids are needed, along with breast milk or a breast-milk substitute. The target range for comple-

mentary feeding is generally taken to be 6–23 months (WHO 2008). The potential health benefits of waiting until 6 months to introduce other foods outweigh any potential risks. Thus, the global consensus based on available evidence is to introduce nutritionally adequate and safe complementary foods to infants at 6 months of age while breastfeeding continues for up to 2 years of age or beyond (WHO 2002). The main

guiding principle of infant and young child feeding states 'practice exclusive breastfeeding from birth to 6 months of age, and introduce complementary foods at 6 months of age (180 days) while continuing to breast-feed'. The guiding principles of complementary feeding for the breastfed child apply to normal, term infants including low birthweight infants born after 37 weeks of gestation (Pan American Health Organization & World Health Organization 2003). The risk of iron deficiency is high among low birthweight infants and infants of mothers with pre-natal iron deficiency, and for these infants, iron supplementation may be indicated prior to 6 months for prevention of iron deficiency (Dewey *et al.* 1998; Domellof *et al.* 2001). Optimal complementary feeding depends not only on its timely introduction but also on appropriate feeding frequency, nutritional adequacy, consistency of food, safety of food and feeding behaviour of the caregiver (Pan American Health Organization & World Health Organization 2003).

The importance of appropriate complementary feeding for young children in South Asia

Improved feeding of children less than 2 years of age is particularly important because they experience rapid growth and development, and are vulnerable to illnesses such as acute respiratory infections and diarrhoeal diseases. There is evidence that appropriate feeding during this 'critical window' will reduce undernutrition, childhood illness and mortality, especially in the resource-poor settings (Bhutta *et al.* 2008). It has been found that interventions that occur after this critical 2-year window will not have much impact on the growth of a child (Brown *et al.* 1998; Bhutta *et al.* 2008).

The South Asian region has the highest global burden of child undernutrition, with almost 41% of children less than 5 years stunted, 16% wasted and 33% underweight (Black *et al.* 2008). A previous analysis based on Demographic and Health Surveys (DHS) data revealed that the timely introduction of complementary food was unsatisfactory in all South Asian countries (Dibley *et al.* 2010).

Indicators to measure complementary feeding

Indicators to assess complementary feeding practices were not available until recently when the WHO together with other partners developed a set of new and updated indicators for Infant and Young Child Feeding Practices (IYCF) (WHO *et al.* 2008; Daelmans *et al.* 2009). The main indicators are:

1. introduction of solid, semi-solid or soft foods: proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods,
2. minimum dietary diversity: proportion of children 6–23 months of age who receive foods from four or more food groups of the seven food groups,
3. minimum meal frequency: proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more, and
4. minimum acceptable diet: proportion of children 6–23 months of age who receive a minimum acceptable diet. This composite indicator is calculated from the following two fractions: breastfed children 6–23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day, and non-breastfed children 6–23 months

Key messages

- The South Asia Infant Feeding Research Network (SAIFRN) has carried out analyses of existing DHS data to assess complementary feeding practices in the South Asia using the new global indicators.
- SAIFRN supports the continued use of these indicators and suggests improvements in the data collected in surveys to ensure that the new indicators can be reliably calculated.
- This supplement would empower the policy makers and programme managers with an in-depth knowledge about these indicators in each country as well as the risk factors for inappropriate feeding.

of age who received at least two milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day.

The advantages of these new indicators include the applicability to cross-sectional household survey data and relevance to other dimensions of feeding, such as frequency feeding and diversity of diet. An analysis of DHS data using recent surveys across 40 countries revealed that the majority of the countries had minimum dietary diversity, minimum meal frequency and minimal acceptable diet for the breastfed less than 50%, although the introduction of complementary food in 6–8-month-aged children was relatively higher (WHO *et al.* 2010).

Aims of this analysis

The adoption by mothers/caregivers of optimal breastfeeding and complementary feeding practices is needed to ensure appropriate infant and young child growth and development. Although maternal/caregiver decisions ultimately determine how an infant and young child is fed, these decisions do not occur in isolation, but rather reflect the immediate and overall environment in which they are made and carried out (Pan American Health Organization & World Health Organization 2003). The overall status of the complementary feeding indicators have been analysed and published by the WHO and partners in the report entitled Indicators for IYCF Practices Part III – Country Profiles (WHO *et al.* 2010). However, an analysis on how these feeding practices vary across a wide range of socio-demographic and health service-related factors has not been performed. Knowledge on the reasons for inappropriate complementary feeding practices or the risk factors is necessary to develop policies and programmes to improve the situation. This supplement would empower the users of the DHS data with an in-depth knowledge about these indicators in each country as well as the risk factors for inappropriate feeding.

The South Asia Infant Feeding Research Network (SAIFRN) is one of the first groups that has worked on analyses of existing DHS data to assess comple-

mentary feeding practices in the South Asia using the new global indicators. The present supplement aimed to describe the complementary feeding practices in five South Asian countries – Bangladesh, India, Nepal, Pakistan and Sri Lanka. The analysis was further extended to identify individual, household, health care-related and community characteristics that are linked with inappropriate practices.

What SAIFRN did?

The present supplement on analysis of complementary feeding appears as the second series of research papers from the SAIFRN – the focus of the first supplement was on breastfeeding practices in the region (Senarath & Dibley 2010). The SAIFRN held a series of workshops to study and discuss the operational guidelines for new indicators in consultation with regional and international experts. The latest DHS for Bangladesh, Nepal, Pakistan and Sri Lanka, and the National Family Health Survey for India were used as data sources. Statistical programmes were developed to analyse the data, and statisticians in the region were trained to conduct the analyses. The analyses were restricted to the youngest child aged 6–23 months in the household, living with the respondent (ever married women of 15–49 years). Four key indicators were calculated: introduction of solid, semi-solid or soft foods in 6–8-month-aged children, and minimum dietary diversity, minimum meal frequency and minimum acceptable diet in 6–23-month-aged children. Univariate and multivariate logistic regression analyses were performed to identify the determinants of poor feeding practices.

The preliminary findings have been discussed at several forums within each country and regionally with representation of nutritional epidemiologists, health programme managers and development assistance partners, such as WHO and UNICEF. The analytical strategies, presentation of results and their interpretations were based on several discussions between SAIFRN members and collaborators in order to ensure validity of results and relevance of the findings for policies and programmes.

In the application of the new complementary feeding indicators to existing DHS data, SAIFRN

came across certain issues in the interpretation of results, which will be discussed in the papers in this series. Some of the key issues were as follows:

- Dietary diversity, although a useful indicator may not reflect the nutritional adequacy which also depends on the density of the food used and the quantity in each feed.
- During data collection, determining the correct food item for mixed food preparations, combinations of foods, local food recipes and fast food items could be an issue. Therefore, the dietary diversity will reflect whatever decision has been made about food items at the interview. This would pose a limitation in interpreting the dietary diversity.
- In certain South Asian households, non-animal foods are the only or predominant source of nutrition due to various socio-cultural reasons. There should be an alternative measure of assuring the minimal acceptable diet in households with such dietary restrictions.
- The minimum acceptable diet for the entire group of children (both breastfed and non-breastfed children) cannot be calculated with the current DHS data due to the absence of information about the number of milk feeds given to non-breastfed children.

Key findings

The first country paper in this series presents the situation in Bangladesh, where in spite of reasonable rates for introduction of complementary food at 6–8 months of age (71%) and for minimum meal frequency (82%), the rates of minimum dietary diversity (42%) and minimum acceptable diet for the breastfed (40%) remained comparatively low in infants 6–23 months. The analysis showed several factors that were consistently associated with poor complementary feeding indicators, including low household wealth, low levels of parental education especially fathers' education and selected geographic areas in the country.

The second country paper reveals that in India only half (55%) of the children aged between 6 and 8 months were introduced to solid foods. The rate of minimum meal frequency was 42%, but both

minimum dietary diversity (15%) and minimum acceptable diet for the breastfed (9%) were alarmingly low in children 6–23 months. The factors that consistently emerged to be significantly associated with inappropriate feeding indicators in India were poverty, low level of maternal education, lower frequency of antenatal visits and no exposure to media.

The third country paper presents the situation in Nepal, where there were reasonable rates of introduction of complementary food during 6–8 months (70%) and meal frequency (82%), but the rates of minimum dietary diversity (42%) and minimum acceptable diet for the breastfed (40%) were low in infants 6–23 months. Consistent with Bangladesh and India, the children from the poor households and illiterate mothers were found to have poor complementary feeding practices in Nepal.

The country paper for Pakistan does not describe the new indicators because the most recent DHS survey did not collect details about the types of food or liquids given to the child. However, it was found that the majority of the Pakistani infants surveyed did not receive complementary foods at the recommended time. The rate of introduction of complementary food among 6–8-month-old infants was 39%. Among infants aged 3–5 months, 11% already received solids, semisolid or soft foods, which indicates too early introduction of complementary feeding in this population.

The last country paper describes a contrasting situation in Sri Lanka, where the indicators of complementary feeding practices were higher than in all other South Asian countries examined in this supplement, namely the introduction of complementary food at 6–8 months of age (84%), the rate of minimum dietary diversity (71%), and the minimum meal frequency (88%) and minimal acceptable diet for the breastfed (68%). Children who lived in tea estate sector had a lower dietary diversity and minimum acceptable diet than children in urban and rural areas. Other determinants of not receiving a diverse or acceptable diet were lower maternal education, lower wealth index, lack of post-natal visits, unsatisfactory exposure to media and acute respiratory infections.

Finally, a comparison between countries is presented across the region aiming to identify determi-

nants that are common to many countries. The most consistent determinants of inappropriate complementary feeding practices across all countries were the lack of maternal education and lower household wealth.

Implications of the findings for policy, practice and research

Our results indicate that the diversity of diet among infants were very low in all countries, except Sri Lanka. The evidence that certain subgroups have poor practices is useful for stakeholders involved in IYCF and nutrition policy and programmes in the region. Groups at risk of having inadequate complementary feeding should be specifically targeted by those policies and programmes.

We observed that rates of minimal acceptable diet were very close to the minimal dietary diversity, especially in countries with higher meal frequency. Furthermore, the variation of acceptable diet and diversity showed a similar pattern across various socio-demographic characteristics. The risk factors that were associated with minimum acceptable diet were almost similar to that of dietary diversity. However, the research that led to the development of new WHO indicators based on the data from various populations found that both frequency and diversity were seen as separate domains that needed their own indicators (Working Group on Infant and Young Child Feeding Indicators 2006). It is possible that the quality of the meal frequency data is not of the same quality as used in background research used to prepare the indicators. It is also possible that the role of frequency varies in different populations with different infant feeding practices. Further research is needed to see whether dietary diversity in South Asian populations can be used as a proxy for minimum acceptable diet. The validity of the minimum meal frequency in explaining the minimum acceptable diet should also be investigated.

This analysis did not verify the validity of indicators in predicting the child nutritional status outcomes, such as stunting, wasting and underweight. Feeding is a complex issue related to many socio-cultural attributes that vary between and within countries.

SAIFRN proposes further studies to validate these indicators as predictors of nutritional adequacy in South Asia and to assess their comparability across countries in the region.

SAIFRN supports the continued use of these indicators and suggests improvements in the data collected in surveys to ensure that the new indicators can be reliably calculated. Continued consistent use of the indicators will be needed to ensure that the progress with programs can be monitored through repeated surveys and trends in the rates of these indicators established.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Contributions

US reviewed literature and drafted the manuscript and revised it. MJD structured the outline of paper, and revised the paper and edited the final script.

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