SPRING

Sustainable Programme Incorporating Nutrition & Games

Guide to the SPRING Evaluation Databases and Database Indicators

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1 Overview

SPRING stands for **S**ustainable **Pr**ogramme **I**ncorporating **N**utrition and **G**ames. It is an integrated nutrition and development intervention delivered at scale by community-based agents (CBAs), through monthly home visits from pregnancy through the first two years of life using a cognitive behavioural therapy (CBT) based counselling approach to enhance the likelihood that behaviour change will occur. The impact of the SPRING intervention on child growth and development is being evaluated through parallel cluster randomized controlled trials in India and Pakistan.

SPRING is funded through a Wellcome Trust Programme Grant, which includes the development of the SPRING intervention and the impact evaluation. An additional grant from the Strategic Impact Evaluation Fund (SIEF) allows additional data collection on intermediate variables, process and implementation including costs together with additional qualitative and statistical analyses, in order to develop a more detailed understanding concerning how any impacts have been achieved and to inform going to scale with SPRING.

This document provides an overview of the evaluation design and lists the methods used in the construction of key impact indicators that have been created from data collected during the evaluation surveys and stored in the survey databases. Definitions of indicators and their variable names are listed in tables in this document in Sections 2 to 7, and are grouped by theme.

All database variables can also be found listed (and briefly described) in the data dictionaries:

"**SPRING_DD_ImpactAssessment_[Country].xlsx**", "**SPRING_DD_ImpactFeedingfoll_[Country].xlsx**", and **"SPRING_baseline_[Country]".**

Where [Country] is India or Pakistan. A description of the content and provenance of the data dictionaries and databases is provided in Section 8 (end) of this document.

1.1 SPRING Cluster Randomised Trial

The SPRING intervention is being evaluated through cluster randomised trials in India and in Pakistan. The key features of the Pakistan trial are shown in **Table 1.1** 1.1.1 and the India trial in Table 1.1.2. Baseline surveys were conducted in each site prior to the implementation of the interventions and baseline data were used to inform the randomisation (to ensure balance between intervention arms for key variables).

Table 1.1.1: Key Features of SPRING Cluster Randomised Controlled Trial, Pakistan

Setting	Rawalpindi District, Punjab, Pakistan
Randomisation Units (Clusters)	20 Union Councils; population of about 20,000. 10 intervention & 10 control clusters, allocated using restricted randomisation
Randomisation procedure	Restricted randomisation used to ensure balance between intervention and control clusters at baseline with respect to: % children stunted at 18-30 months; % deliveries in health facility; % mothers with no schooling
Target group in each cluster	Pregnant women and mothers with babies aged less than two.
Intervention Clusters	▪ **SPRING intervention:** Roshan Kal delivered through routine monthly home visits by Lady Health Workers (LHWs); approx. 15 LHWs per cluster. ▪ **Fully implemented from 2 May 2014**
All Clusters (Intervention & Control)	▪ Advice as currently provided through monthly home visits by LHWs ▪ Access to routine maternal and child health services
Surveillance system for evaluation	▪ 10-weekly visits by resident FWs ▪ All married women of reproductive age who have not been sterilised living in evaluation zones covering 7 contiguous LHW catchment areas in each of the trial clusters.
Trial participants	Mother-baby dyads of all live born babies identified by the surveillance system in trial clusters in the period on or after the date of full implementation of SPRING until the date that sample size requirements are met.
Exclusion criteria	Major congenital malformation Maternal death in neonatal period

Table 1.1.2: Key Features of SPRING Cluster Randomised Controlled Trial, India

Setting	Rewari District, Haryana, India
Randomisation Units (Clusters)	24 clusters – catchment area of a health sub center with a minimum population of 5000 and a functional Auxiliary Nurse Midwife (ANM). 12 intervention & 12 control clusters, allocated using restricted randomisation
Randomisation procedure	Restricted randomisation used to ensure balance between intervention and control clusters at baseline with respect to: % children stunted at 18-30 months; % deliveries in health facility; % mothers with no schooling
Target group in each cluster	Pregnant women and mothers with babies aged less than two.
Intervention Clusters	- **SPRING intervention:** Kilkaari delivered through routine monthly home visits by project appointed community based agents called Kilkaari workers; 54 Kilkaari workers in 12 clusters. - **Fully implemented from 18 June 2015**
All Clusters (Intervention & Control)	- Advice as currently provided by government frontline health works, viz., ASHAs, AWWs and ANMs - Access to routine maternal and child health services
Surveillance system for evaluation	- 8-weekly visits by resident fieldworkers - All married women of reproductive age who have not been sterilised living in the cluster villages.
Trial participants	Mother-baby dyads of all live born babies identified by the surveillance system in trial clusters in the period on or after the date of full implementation of SPRING until the date that sample size requirements are met.
Exclusion criteria	Major congenital malformation Maternal death in neonatal period

Information on the trial outcomes is provided in Table 1.1.3 and Table 1.1.4, together with the assessment tools used, the timing of the assessment and the participant sample it was collected from.

Table 1.1.3 SPRING Trial Outcomes: Pakistan – Primary outcomes are shown in bold

Outcome	Assessment	Sample	Age of child
SPRING Impact Outcomes			
Child Development	Bayleys' Scales of Infant Development (BSID-III): psychomotor, cognitive & language	Child assessment sub-sample	18 months
Child Growth	WHO Growth Standards Z-scores	Child assessment sub-sample	18 months
Main Intermediate outcomes			
HOME Inventory score	HOME (Home Observation Measurement of the Environment Inventory) at 12 months	Child assessment sub-sample	12 months
Complementary Feeding Practices	Feeding Questionnaire at 12 months	Child assessment sub-sample	12 months
	Surveillance questions re feeding practices	All trial children	every 10 weeks
Breastfeeding	Surveillance: breastfeeding in last 24 hours	All trial children	every 10 weeks
Maternal mental wellbeing	Patient Health Questionnaire (PHQ-9)	Maternal assessment sub-sample	12 months
Additional Intermediate outcomes			
Maternal social support & stress	Dukes Social Support and Stress Scale (DUSOCS)	Child assessment sub-sample	18 months
Maternal knowledge	Questionnaire at 18 months	Child assessment sub-sample	18 months
Maternal Efficacy	Agency and Capability Questionnaire	Economic sub-sample	12 months

Table 1.1.4 SPRING Trial Outcomes: Pakistan – Primary outcomes are shown in bold

Outcome	Assessment	Sample	Age of child
SPRING Impact Outcomes			
Child Development	Bayley Scales of Infant Development (BSID-III): psychomotor, cognitive & language	Child developmental assessment sub-sample	18 months
Child Growth	WHO Growth Standards Z-scores	Child developmental assessment sub-sample	18 months
Main Intermediate outcomes			
HOME Inventory score	HOME (Home Observation Measurement of the Environment Inventory) at 12 months	Child developmental assessment sub-sample	12 months
Complementary Feeding Practices	Feeding Questionnaire at 12 months	Child nutrition & maternal sub-sample	12 months
	Surveillance questions re feeding practices	All trial children	every 8 weeks
Breastfeeding	Surveillance: breastfeeding in last 24 hours	All trial children	every 8 weeks
Maternal mental wellbeing	Patient Health Questionnaire (PHQ-9)	Child nutrition & maternal sub-sample	12 months
Additional Intermediate outcomes			
Maternal social support & stress	Dukes Social Support and Stress Scale (DUSOCS)	Child nutrition & maternal sub-sample	12 months
Maternal knowledge	Questionnaire	Child nutrition & maternal sub-sample	12 months
Maternal Efficacy	Agency and Capability Questionnaire	Economic sub-sample	18 months

1.2 Sample Size

The sample sizes shown in bold in Table 1.2.1 are sufficient to give at least 80% power for gender specific analyses and 90% power when boys and girls are combined. All sample sizes were adjusted to take into account the cluster randomized design based on the intra-cluster correlation coefficient (ICC) and the average cluster size. They have also been adjusted to allow 20% losses to follow both from birth to 1 year of age and from 1 year to 18 months of age.

Table 1.2.1: Minimum Sample sizes for SPRING Pakistan trial: By cluster and in total

Complete cohort/cluster	Per Cluster	Total
Live newborns	150	3000
Maternal assessment sub-sample		
Mothers of first babies to reach 1 year of age (allowing 20% loss to follow-up from birth)	**120**	**2400**
Child assessment sub-sample		
Assessment at 1 year: First babies to reach 1 year	63	1260
Impact assessment at 18 months (allowing 20% loss to follow-up from 1 year):	**50**	**1000**

1.3 Baseline Surveys

Baseline surveys were conducted through house to house visits of all households within the trial evaluation clusters by fieldworkers recruited for the surveillance system to be resident in each cluster, with one fieldworker per cluster. They were carried out at the same time as registering all women into the surveillance systems who were aged less than 50 years, married, not sterilized and whose husbands were not sterilised.

Table 1.3.1 SPRING Baseline Surveys: Dates & Response Rates

Baseline Data Collection	India	Pakistan
Dates of baseline data collection	June-October 2014	August 2012-February 2013
Number of occupied households	27,260	18,247
Potentially eligible women interviewed	33,896	32,467
Confirmed eligible	13,528 (39.9%)	21,706 (66.9%)
Registered: Consent given	13,431 (99.3%)	21,662 (99.8%)
Anthropometry Survey	June-October 2014	May-July 2013
Children aged 18-30 months eligible for anthropometry visit	1,676	1,797
Heights & weights both done	1,646 (98.2%)	1,558 (86.7%)
- Child not available	0 (0.0%)	22 (1.2%)
- Child sick	4 (0.2%)	22 (1.2%)
- Child unsettled	9 (0.5%)	185 (10.3%)
- Mother refused	3 (0.2%)	4 (0.2%)
- Outliers (invalid measures)	4 (0.2%)	4 (0.2%)
- Other	10 (0.6%)	2 (0.1%)

The surveys used a baseline questionnaire administered through a mobile based application, which collected data on the youngest child aged less than 5 years including questions on maternal education, place of delivery of the youngest child plus breastfeeding and infant feeding practices. It also recorded GPS coordinates for each household. This was

followed by an anthropometry survey which was carried out by supervisory level staff for children identified who were aged 18-30 months. In India, this was conducted alongside the baseline survey. In Pakistan, the anthropometry survey was carried out later as a separate cross-sectional exercise.

2 SPRING: Child Development Outcomes

2.1 BSID III: Indicator definitions

The Bayley Scales of Infant and Toddler Development, Third Edition (BSID-III) was used to assess the development of children at 18 months of age in the SPRING sites in India and Pakistan. According to the BSID Manual[1]:

"The Bayley-III is an individually administered instrument that assesses the developmental functioning of infants and young children between 1 month and 42 months of age. Its primary purposes are to identify children with developmental delay and to provide information for intervention planning."

Children in the SPRING sites were assessed on three BSID-III domains, Cognitive, Language (receptive and expressive language subtests), and Motor (gross and fine motor subtests). More detail of the BSID-III assessments can be found in the BSID Manuals[1].

[1] BSID-III https://www.pearsonclinical.co.uk/Psychology/ChildCognitionNeuropsychologyandLanguage/ChildGeneralAbilities/BayleyScalesofInfantandToddlerDevelopmentThirdEdition(Bayley-III)/BayleyScalesofInfantandToddlerDevelopmentThirdEdition(Bayley-III).aspx

Table 2.1.1 BSID Indicator definitions. Variables are found in the databases "SPRING_ImpactAssessment_Pakistan.dta" and "SPRING_ImpactAssessment_India.dta".

Outcome	Variable names in database	definition
Impact Outcomes		
		Composite scores
Acronyms I	gm/fm/cog/rl/el	*Gross motor/fine motor/cognitive/receptive language/expressive language. Acronyms also referred to as 'xx_' in this table for efficiency.*
Acronyms II	m/c/l	*Motor/language/cognitive. Acronyms II also referred to as 'x' in this table for efficiency*
Psychomotor scale	**motor_comp**	**Created by combining and converting scaled scores (for two psychomotor subtests below) to a composite score (mean 100: range 46-154)**
Language scale	**lang_comp**	**Created by combining and converting scaled scores (for two language subtests below) to a composite score (mean 100: range 47-153)**
Cognitive scale	**cog_comp**	**Created by converting scaled score (below) to a composite score (mean 100: range 55-145)**
Additional Indicators for further analyses		
Developmental delay		
Mean developmental age ratio	**xx_ratio**	Developmental age/calendar age*100 for each of 5 subtests
Mean delay in months	**xx_delay**	Calendar age(-)developmental age for each of 5 subtests
Developmental age in months	**dev_xx_age**	Developmental age for each of the 5 subtests
% developmentally delayed	**delayx** **sdelayx**	% children below -1SD of global average (composite score<85) for each domain % children below -2SD of global average (composite score<70) for each domain
Scaled scores		
Gross motor subtest (72 items)	**gm_scale**	Starting point for children aged 18m is item 42. Raw totals scaled to a score between 1-19.
Fine motor subtest (66 items)	**fm_scale**	Starting point for children aged 18m is item 28. Raw totals scaled to a score between 1-19.
Receptive language subtest (49 items)	**cog_scale**	Starting point for children aged 18m is item 13. Raw totals scaled to a score between 1-19.
Expressive language subtest (48 items)	**el_scale**	Starting point for children aged 18m is item 14. Raw totals scaled to a score between 1-19.
Cognitive subtest (91 items)	**rl_scale**	Starting point for children aged 18m is item 40. Raw totals scaled to a score between 1-19.

2.2 BSID-III: Raw scoring - methodology

Table 2.2.1 Methdology

Subtest:	gross motor	fine motor	receptive language	expressive language	cognitive
Automatic number of points given to children who start their assessment at section:					
K (age 16m 16days – 19m 15days)	7+34	6+21	5+7	7+6	9+30
J (age 13m 16days – 16m 15 days)	4+34	4+21	2+7	3+6	3+30
I (age 11m 0 days – 13m 15 days)	34	21	7	6	30
Maximum number of points for this subscale (a.k.a. total number of items)	**72**	**66**	**49**	**48**	**91**

2.3 BSID-III: Assessment and Scoring Methods

Each of the five BSID-III Child Development subtests, gross motor, fine motor, cognitive, receptive language and expressive language contain a series of advancing tests (items) assessing child development across three domains; psychomotor, cognitive and language development. Each subtest can be administered to children from age 1 month to 42 months; the section at which a child starts their assessment within a subtest is dependent on their age.

For the SPRING trial, children were assessed between the ages of 18-19 months, corresponding to section **K** in each of the five subtests. If a child was not able to complete the first three items of that section, the first three items of the previous section (**J** age 13m 16days – 16m 15 days) were attempted, and if successful, the child continued through the remainder of section **J**, **K** and beyond from this start point. If the child was not able to complete the first three items of section **J**, the assessor would start at section **I** (age 11m 0 days – 13m 15 days) instead. The subtest assessment was aborted if children were not able to complete the first three items of section **I** ("basal level not established").

However, in the case of most children, a basal level was established and the assessment was continued until the child was not able to complete five consecutive items in a row, at which point the assessment for the subtest ended.

Children receive a point for every successfully completed item from their starting point. They also automatically receive points for all the items in the sections prior to their starting point (Table 2.2). The children without an established basal level (i.e. those who failed to start from any of the available start points I-K), received only the points for the items up to the end of section H.

3 SPRING: Child Growth Outcomes

Height (recumbent length) and weight measurement data was collected according to standard protocols when the children reached 12 and 18 months of age. Height/weight data were converted to z-scores, which were calculated using the STATA module **zscore06** (http://conflict.lshtm.ac.uk/page_125.htm). This is based on the 2006 WHO growth standards[2]. Assumption of no oedema. All heights measured by horizontal length (lying down). Values out of reference range returned to missing.

3.1 Child Growth: Definitions

Table 3.1.1 Child growth definitions. Variables are found in the databases "SPRING_baseline_India", "SPRING_Baseline_Pakistan", "SPRING_ImpactAssessment_Pakistan.dta" and "SPRING_ImpactAssessment_India.dta".

Impact Outcomes	Variable names in database*	**Definition**
Mean height for age z score at 18m visit	**bay_haz06/_zlen**	Heights as number of SDs from WHO reference population median height for age
Mean weight for age z score at 18m visit	**bay_waz06/_zwei**	Weights as number of SDs from WHO reference population median weight for age
Mean height for weight z score at 18m visit	**bay_whz06/_zwfl**	Heights as number of SDs from WHO reference population median height for weight
% stunted	**stunted18**	<-2SDs global median height for age
Additional outcomes for future analyses		
CIAF indicators		
% underweight	**underweight18**	<-2SDs global median weight for age
% wasted	**wasted18**	<-2SDs global median weight for height
% Either stunted, underweight or wasted	**any_ciaf18**	% any indicator <-2sds from global median
wasted + underweight	**underwaste18**	Above threshold (<-2SDs) height for age, low weight for age and low weight for height
wasting + stunting + underweight	**all_ciaf18**	Low weight for age, low weight for height, low height for age
stunting + underweight	**understunt18**	Above threshold (<-2SDs) weight for height, low height for age and low weight for age
12 month anthro indicators		
Mean height for age z score at 12m visit	**home_haz06**	Heights as number of SDs from WHO reference population median height for age
Mean weight for age z score at 12m visit	**home_waz06**	Weights as number of SDs from WHO reference population median weight for age
Mean height for weight z score at 12m visit	**home_whz06**	Heights as number of SDs from WHO reference population median height for weight
Change from 12 to 18 months		
Δ Height for age z score 18-12m	**diff_haz**	Change in height for age z score (difference 18m-12m)
Δ Weight for age z score 18-12m	**diff_waz**	Change in weight for age z score (difference 18m-12m)
Δ Height for weight z score 18-12m	**diff_whz**	Change in weight for height z score (difference 18m-12m)

Ref: https://www.unicef.org/infobycountry/stats_popup2.html; Bulletin WHO Nandy et al 2005. *where names in the Baseline databases are different, the baseline variable names come after '/'. Baseline measurement were taken on children 18-30months of age.

[2] WHO Anthro for Personal Computers Manual: Software for Assessing the Growth and Development of the World's Children. WHO, Geneva **2011**

3.2 Child Growth: Outliers

Children with outliers outside the upper and lower standard deviation boundaries set by the WHO were dropped: these boundaries are:

Table 3.2.1 Boundaries for child growth values

Indicator	**Lower SD**	**Upper SD**
Height for age	-6	+6
Weight for age	-6	+5
Weight for height	-5	+5

Source: WHO and Stata module

4 SPRING: Home Observation Measurement of the Environment (HOME Inventory) at 12 months of age

4.1 HOME Inventory

The Infant/Toddler HOME Inventory has been developed for the assessment of children age 0-3 years. It is used to ascertain the quality and quantity of stimulation, support and structure available to children in the home (Bradley 2015[3]). It contains 45 items on which a child is scored during a semi-structured household observation session by a trained assessor. These items can be grouped into 6 subscales: 1) Parental Responsivity, 2) Acceptance of Child, 3) Organisation of the Environment, 4) Learning Materials 5) Parental Involvement 6) Variety in Experience.

Scoring is a simple binary choice format: 0=no 1=yes. Scores across all items are summed to give a total HOME score for each child (maximum score 45). Subscale-specific scores can also be calculated.

4.2 HOME: Definitions

Table 4.2.1 HOME definitions. Variables are found in the databases "SPRING_ImpactAssessment_Pakistan.dta" and "SPRING_ImpactAssessment_India.dta".

Outcome	Variable names in database*	Definition
Main outcome		
Overall HOME	**home**	**Total score from all HOME tool items = 45**
Additional Outcomes: subscales from the HOME tool		
Responsivity	**responsivity/ responsive**	Total score from subsection I (messy play to praise responding) = 11 items
Acceptance of child's behaviour	**acceptchildbehave/ acceptance**	Total score from subsection II (physical punishment to no interference) = 8 items
Organisation of the environment	**organiseenviron/ organise**	Total score from subsection III (substitute care to safety) = 6 items
Learning materials	**learnmaterials/ learning**	Total score from subsection IV (muscle toys to provide toys) = 9 items
Parental involvement	**parentinvolve/ involve**	Total score from subsection V (talk/work to visual range) = 6 items
Variety	**variety/ variety**	Total score from subsection VI (daily care to owns books) = 5 items
Individual HOME tool items		
Individual item numbers		
Item 36	**encourdment/ home_conscious**	% Caregivers who encourage developmental advancement
Item 08	**twospontprais/ home_praise**	% Caregivers who spontaneously praised child during HOME visit
Item 02	**spontanvoc/ home_vocalize**	% Caregivers who spontaneously vocalize to child at least twice during HOME visit
Item 03	**verbrespond/ home_respond**	% Caregivers who spontaneously respond to child's vocalisations during HOME visit
Item 35	**hworktalk/ home_talkswork**	% Caregivers who talk to child whilst doing housework

*variable names differ slightly in databases for India and Pakistan surveys. Names are provided for both (India/Pakistan)

[3] **R Bradley 2015.** Constructing and Adapting Causal and Formative Measures of Family Settings: The HOME Inventory as Illustration. **J Fam Theory Rev 7 (4): pg 381-414**

5 SPRING: Breastfeeding and Complementary Feeding outcomes

Feeding surveys were conducted every 8-10 weeks on registered households with a child in the SPRING study. An additional detailed feeding survey was conducted in each eligible household when the child reached 12 months of age. Questions were asked about feeding practices on the day of delivery, the last 24 hours, and the last week. Analysis indicators were constructed according to the definitions in the WHO Feeding indicator manuals[4].

5.1 Feeding: Definitions

Table 5.1.1 Feeding Definitions. Variables are found in the databases "SPRING_ImpactAssessment_Pakistan.dta", "SPRING_ImpactAssessment_India.dta", "SPRING_impact_feedingfoll_pakistan.dta" and "SPRING_impact_feedingfoll_india.dta"

Outcome[4]	Variable names in database*	**Definition**
% Babies with no pre-lacteals in the first 24 hours of life	**noprelac**	**Baby did not receive other foods in the first 24hrs (ghdala, water, etc all=no)**
% Babies breastfed within an hour of birth	**bf1hr/initiated**	**First feed was <1hr (firstbf)**
% Exclusively breastfed in period 4-5m	**exclbf, agem_at_visit**	**Baby received only breastmilk (bf_last=yes all others=no) in the last 24 hours, Babies 4-5m of age**
% Exclusively breastfed in period 0-5m	**exclbf, agem_at_visit**	**Baby received only breastmilk (bf_last=yes all others=no) in the last 24 hours, Babies 0-5m of age**
% Infants receiving complementary food at 6 months of age (subset of infants with surveillance visit at this age)	**complimentary6m**	**Infant receives semi or solid foods (semisolid_last, solid_last) 6 months: age >/=6 months and age< 7 months**
% Caregivers who specifically enriched weaning foods with oil/butter since starting complementary feeding (12-month questionnaire)	**enrich**	**Mother specifically enriches food with oil or butter (Pakistan only)**
% Infants receiving 4 or more food groups yesterday (12-month questionnaire)	**food4grp**	**Infant receives 4+ different food groups (food_grains food_pumpkin etc, combined to give 7 WHO groups)**
% receiving recommended number of meals (12-month questionnaire)	**rec_mealfreq**	**Breastfed: at least 3 meals/day yesterday Non-breastfed: at least 4 meals/day yesterday**
WHO criteria for minimum acceptable diet (12-month questionnaire)	**who_3recommend**	**Breastfed or had 2+ milk feeds, AND Had food from 4 or more food groups (dairy included as food group for non-bf), AND 3 or more meals (bf), 4 or more meals (non-bf) a day, yesterday**

*where names in the Baseline databases are different, the baseline variable names come after '/'. Baseline measurement were taken on children 0-59months of age.

[4] Complementary feeding definitions: **WHO 2010.** Indicators for Assessing Infant and Young Child Feeding Part I and II. **Geneva Switzerland**

continued

Additional Outcomes		
Outcome[5]	Variable names in database	**Definition**
% Babies 0-5 months exclusively breastfed yesterday, by age	**exclbf, agem_at_visit**	Baby received only breastmilk (bf_last=yes) Babies 0-5m of age
% Babies 6-23 months breastfed yesterday, by age	**bfany, agem_at_visit**	Baby received breastmilk (bf_last=yes) Babies 6-23m of age
% Infants receiving recommended number of solid/semi solid meals for age group (6-8, 9-11 and 12-18 months) yesterday	**rec_mealfreq**	Breastfed: 6-8m- at least 2 meals; 9-11m- at least 3 meals; 12-18- at least 3 meals Non-breastfed: 6-18m: at least 4 meals. (Pakistan only)
Mean number of semisolid and solid meals received yesterday (6-11 and 12-18 months)	**mealtot**	Mean: solid/semi-solid feeds yesterday (solid_freq+semi_solid_freq) (Pakistan only)

[5] Complementary feeding definitions: **WHO 2010.** Indicators for Assessing Infant and Young Child Feeding Part I and II. **Geneva Switzerland**

6 SPRING: Patient Health Questionnaire (PHQ-9)

The PHQ-9 is the depression module of the Patient Health Questionnaire, a self-administered screening tool for common mental disorders[6]. Questions from the depression module were asked by field technicians to mothers of 12-month old children in the survey. The questionnaire consists of 9 items about feelings, behaviours and thoughts in the past two weeks.

6.1 PHQ-9: Definitions

Table 6.1.1. PHQ-9 variable definitions. Variables are found in the databases "SPRING_ImpactAssessment_Pakistan.dta" and "SPRING_ImpactAssessment_India.dta"

Outcome[6]	Variable names in database	Definition
Main Outcomes		
Overall PHQ9 score	**totphq9**	Total score. Sum of items 1-9. Up to 3 points per item available. Maximum score is 27
Moderate to severe depression	**mod2sev_dep**	Score of 10-27
Suicidal tendencies	**suicide**	Answered 'yes' to question about thoughts of feeling "better off dead/hurting oneself for several days or more" ('yes' = options 1-3)
Additional outcomes for further analyses		
Any depression	**depress**	Score of 5 or more
Moderate-severe to severe depression	**sevmodsev_dep**	Score of 15-27
Severe depression	**sevdepress**	Score of 20-27
Difficulty in doing daily work (any)	**difficult**	Had at least some difficulty (options 2-4) in daily work.
Significant difficulty in doing daily work	**vdifficult**	Found daily work very or extremely difficult (options 3-4).

[6] **Kroenke K 2001**. Validity of a brief depression severity measure. **J Gen Intern Med Vol 16 pg 606**

7 SPRING Pakistan: DUKE's Social Support and Stress Scale, Maternal Knowledge, Capabilities and Agency

The Duke's Social Support and Stress Scale asks mothers to quantify how much people within their family circle and external to their family support and/or stress them. Points are given for the degree of support (or stress) provided by each type of person; not at all (0), some (1), a lot (2). These points are added within sections (family section and non-family section) to give family and non-family support and stress sub-scores, and sub-scores are combined to give an overall support or stress score.

In addition to this, mothers are asked to identify (question 11) if there is a person who is causing them the most stress, or providing significant support at the current time. If such a person exists and they are a family member, two points are added to the family sub-score. If they exist but are not a family member, two points are added to the non-family sub-score. The two points are also included in the overall score.

Final support and stress scores are displayed as ratios (divided by the maximum score available for the section or overall).

The Maternal Knowledge questionnaire aimed to determine how well the SPRING intervention messages had been received and retained by study mothers. A list of statements about feeding, health and child stimulation were read to mothers who had to agree/disagree (23 statements).

Details of the maternal agency and capabilities measurements are provided in Table 7.4.1 below.

7.1 Dukes Social Support and Stress: Definitions

Table 7.1.1 DSSS definitions. Variables are found in the databases "SPRING_ImpactAssessment_Pakistan.dta" and "SPRING_ImpactAssessment_India.dta"

outcome	Variable names in database	definition
Main Outcomes		
Duke Social Support score	**dukesupp**	Support network of caregiver (11 item tool, 22 points in total)
Duke Stress score	**dukestr**	Stressors of caregiver (11 item tool, 22 points in total)
Maternal Knowledge % correct	**knowledge**	Knowledge of caregiver about feeding and home stimulation practices. % calculated as raw score/23*100
Agency Score	**n_agency**	Agency: the extent to which an individual's actions are determined by their own intrinsic motivation as opposed to external pressure by other people
Capability Score	**n_capabilities**	Capability: The extent to which an individual is able to achieve important and valued 'functionings', i.e. ways of being and doing in life.
Additional outcomes for further analyses		
Duke family support score	**supp_duke_fam**	Family support network (maximum 7 items, total of 14 points)
Duke non-family support score	**supp_duke_nonf**	Non-family support network (maximum 5 items, total of 10 points)
Duke family stress score	**str_duke_fam**	Family stressors (maximum 7 items, total of 14 points)
Duke non-family stress score	**str_duke_nonf**	Non-family stressors (maximum 5 items, total of 10 points)

7.2 Appendix C: Calculation of Duke scores

Table 7.2.1 DSSS methodology.

item number	Item (how supportive/stressful is your:)	Points available for this item	
		Duke Social support	**Duke Stress**
1b	husband	0-2	0-2
2b	elder children	0-2	0-2
3b	parents	0-2	0-2
4b	siblings	0-2	0-2
5b	uncles/aunts/cousins	0-2	0-2
6b	in-laws	0-2	0-2
7b	neighbours	0-2	0-2
8b1-3	government worker (replaced “co-workers” on original form)*	0-2	0-2
9b	welfare committee/religious	0-2	0-2
10b	other friends	0-2	0-2
11a	one person most supportive/stressful (specify family/non family)	0 or 2	0 or 2
Overall raw score		**22**	**22**
Maximum family raw score		**14**	**14**
Maximum non-family raw score		**10**	**10**
Duke standardised family support or stress score (max 100)		[Sum of 1B-6B (+ 2 points for 11A if family member)] /14*100	[Sum of 1B-6B (+ 2 points for 11A if family member)] /14*100
Duke standardised non-family support or stress score (max 100)		[Sum of 7B-10B (+ 2 points for 11A if non-family member)] /10*100	[Sum of 7B-10B (+ 2 points for 11A if non-family member)] /10*100
Duke standardised overall support or stress score (max 100)		**Sum(1b-11a)/22*100**	

*Up to 3 options for government worker type allowed, highest score used

7.3 Maternal Knowledge: Calculation of Maternal Knowledge Scores and Key Message Domains

Table 7.3.1. Maternal Knowledge methodology and correct answers.

item number	1 point if circled:	item number	1 point if circled:
mk1	1	mk3	2
mk2	1	mk4	2
mk5	1	mk6	2
mk7	1	mk11	2
mk8	1	mk14	2
mk9	1	mk15	2
mk10	1	mk16	2
mk12	1	mk17	2
mk13	1	mk18	2
mk22	1	mk19	2
mk23	1	mk20	2
total 23 points		mk21	2

Message domains

Breastfeeding	Complementary feeding	Stimulation/Interaction
Mk1	Mk9	Mk4
Mk2	Mk10	Mk5
Mk3	Mk17	Mk7
Mk6	Mk20	Mk12
Mk8	Mk21	Mk13
Mk11	Mk22	Mk14
Mk19	Mk23	Mk15
		Mk16
		Mk18

7.4 Maternal Agency and Capabilities: Scoring

Table 7.4.1 Scoring method for maternal agency and capabilities.

Outcome	Definition
Impact Outcomes	
Scores	
Agency	Agency: the extent to which an individual's actions are determined by their own intrinsic motivation as opposed to external *pressure b*y other people Agency score: created by calculating a weighted average of 30 items (10 each in 3 domains). Items reflecting internal motivation were weighted +1, and items reflecting external motivation were weighted - $^{2}/_{3.}$ Possible maximum and minimum values of scores are +12 and -12, respectively **(mean 5.33: range -5-12)**
Capability	Capability: The extent to which an individual is able to achieve important and valued 'functionings', i.e. ways of being and doing in life. Capability score: created by using pubished weights ((Al-Janabi et al 2013; Flynn et al, 2015) Possible maximum and minimum values of scores are -0.05 and +1, respectively **(mean 0.78: range 0-1)**

8 Guide to the SPRING databases and data dictionaries

This final section contains descriptive characteristics of the SPRING trial databases and dictionaries for India and Pakistan.

The final SPRING impact evaluation databases are comprised of the:

Baseline survey (cross-sectional, pre-implementation of SPRING): **2 databases** – India and Pakistan
Assessment survey (children aged 12 and 18 months, cross-sectional, post-implementation of SPRING): **2 databases** – India and Pakistan
Monthly feeding survey (longitudinal follow-up of children from birth, post-implementation of SPRING): **2 databases** – India and Pakistan
database names can be found in tables 8.1-8.3 below.

Anonymity

Data have been anonymised by the removal of parent and child names, dates of birth, dates of visit, and original IDs that could link this database to the original non-anonymous survey data. Ages of children and mothers at the time of each visit, and the month and year of birth of the children have been included. The general time periods over which data for the surveys were collected are provided at the end of this document. All data required to replicate the analyses presented in the Trial Impact Reports[i] have been included, plus relevant variables for additional related analyses.

Metadata

Data dictionaries listing the variable names, labels and brief descriptions are available for each database. Together with this Guide, these dictionaries comprise the Metadata for the SPRING impact evaluation databases. Full variable definitions including details of how impact indicators were created can be found in precious sections of this document.

8.1 Baseline survey databases

Detail	India	Pakistan
Name of database file	01_SPRING_Baseline_India	SPRING_baseline_pakistan
Name of data dictionary file	01_SPRING_DD _Baseline_India.xlsx	SPRING_DD _Baseline_Pakistan.xlsx
Number of rows/number of variables	7625/22	8325/22
Dates of visit (range)	June 2014 – October 2014	August 2012 – July 2013

8.2 Assessment survey databases

Detail	India	Pakistan
Name of database file	02_SPRING_ImpactAssessment_India	SPRING_impactassessment_Pakistan
Name of data dictionary file	02_SPRING_DD_ImpactAssessment_India.xlsx	SPRING_DD_ImpactAssessment_Pakistan.xlsx
Number of rows/number of variables	5049/250	5048/236
Date of visit (range)	July 2016 – April 2017 (12m assessment) January 2017 – October 2017 (18m assessment)	May 2015 – October 2016 (12m assessment) November 2015 – August 2016 (18m assessment)

8.3 Longitudinal feeding survey databases

Detail	India	Pakistan
Name of database file	03_SPRING_ImpactFeedingFollowup_India	SPRING_impact_feedingfoll_pakistan
Name of data dictionary file	03_SPRING_DD_ImpactFeedingFollowup_India	SPRING_DD _ImpactFeedingfoll_Pakistan.xlsx
Number of rows/number of variables	33408/17	26000/26
Date of visit (range)	June 2015 – July 2017	May 2014 – August 2016

9 Contacts

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[i] Kirkwood B, Roy R, Soremekun S. 2018. Evaluation of SPRING Intervention: Pakistan/India Trial Outcomes. Report to the Strategic Impact Evaluation Fund (SIEF). [Confidential]. April 2018, Revised November 2018 (2 reports).