Testing the effectiveness of edutainment videos on improving knowledge, attitudes and outcomes towards Minimum Diet Diversity (MDD) for young children (6-23 months)

A Study by Centre for Social and Behaviour Change, Ashoka University

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This project is officially documented here, on the AEA RCT Registry.

Digital Narratives: Measuring the effectiveness of videos using narratives in increasing MDD knowledge, attitudes and intentions

PRE-ANALYSIS PLAN

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1. AIM

Minimum Diet Diversity (MDD) refers to the concept that children between 6 and 24 months old (referred to as *young children* throughout the rest of this document) should be fed a minimum of 4 of 7 food groups along with breastmilk everyday. It may appear complex, technical, and requires people to think in-depth about food choices, in contrast to how people usually think about food, which is often reactionary, emotional, and based on previous practices. To address this problem, the Centre for Social & Behaviour Change, Ashoka University has developed edutainment resources for health messaging to use the power of stories that engage people's interest and increase their recall of information and ideas.

Through this experiment, we aim to understand the effectiveness of episodic narrative style videos (*Tales of Mazrupur)* and standalone song adaptation videos (*Khaan Paan Gaan)*, in increasing knowledge, attitudes and intention (KAI) to change feeding practices for young children compared to KAI for existing MDD collaterals used by the government.

Theory of Change

Inputs	Assumptions	Outputs	Outcomes
Videos using narrative techniques to explain child feeding	*Tales of Mazrupur* will find the videos novel and the narrative will transport and engage viewers. Viewers will find the characters relatable.	Respondents are better able to identify and comprehend MDD messaging. Respondents are interested in watching the videos. Respondents find the video entertaining.	1. Increased knowledge about MDD for young children(4 food groups to be consumed of 7 every day) 2. Respondents associate an increased importance of MDD with their child's health (for their immunity, overall development, future success etc) 3. Respondents intend to feed their child a healthy, diverse diet (4 food groups out of 7 per day)
Song adaptation videos using known music to catch attention and explain child feeding	Respondents will find the songs novel and relate to the bollywood song adaptations in *Khaan Paan Gaan* from songs they have heard in their youth.		

Description of materials

Tales of Mazrupur: A series of 5 episodic-style narrative animated videos. The duration of each video is 3.5 to 4 minutes on average. They address the primary outcomes of:

1. The importance of MDD for infants (to build immunity and strength etc.)
2. Food groups/items young children in the age group of 6-24 months should be fed

Khaan Paan Gaan: A series of 4 animated videos of bollywood song adaptations. The duration of each video is 1 to 1.5 minutes on average. They address the primary outcomes of:

1. MDD for young children over 6 months of age
2. Food groups/items young children in the age group of 6-24 months should be fed

Control 1: Two videos developed for Poshan Abhiyan, Government of India edited to match the length of the *Tales of Mazrupur* intervention videos. The videos are animated and Informational/Instructional modules in the form of a skit. They address the primary outcomes of:
1. MDD for young children over 6 months of age
2. Importance of CF for young children (for mental and physical development)
As well as other secondary information about MDD commonly covered by government collateral such as food preparation etc.

Poshan Abhiyan Module 6: 10:31 mins
Poshan Abhiyan: 4:41 mins (selections tailored to Anganwadi worker training)

Control 2: Four separate short unedited musical videos from different sources developed by/distributed by the Ministry of Women and Child Development, Government of India on MDD for infants (compiled to match duration of *Khaan Paan Gaan* intervention videos). These include three non- animated and one animated informational/entertaining videos tailored to the general audience. They address the primary outcomes of:

1. MDD for young children over 6 months of age
2. Importance of CF for young children

As well as other secondary information about child and maternal nutrition commonly covered by government collateral such as EBF, colostrum, maternal diet diversity etc.

1. NHM Saheli: 1:00 min (non-animated)
2. PA puppets animated: 2:12 mins (animated)
3. PA father: 1.06 mins (non-animated)
4. HP 4 steps: 00:52 mins (non-animated)

Pre-testing of Control Videos

To select the control videos for the experiment, a pre-test was conducted with 10 government collateral videos/series of videos on MDD for young children. These videos were selected based on an extensive review of an archive of government public campaign collaterals, training modules, etc. and edited/compiled to match the duration of the treatment videos. An online survey was conducted with 360 respondents (valid responses), where respondents were randomly assigned to view one video/video series. Respondents were then asked to answer questions regarding the tone, quality, narrative techniques and shareability of the videos viewed by them.

The final control videos for the experiment were selected based on parity between control videos and treatment videos on quality and tone, two factors that should be the same between videos employing narrative techniques and those without.

2 DATA COLLECTION AND CODING

Sample size

Power calculations were carried out to determine the minimum sample size required per arm to detect a medium effect size (Cohen's H = 0.5). Data from two unpublished studies conducted by CSBC in Madhya Pradesh, India in 2021 were used to carry out power calculations. Power calculations were carried out separately for two outcome variables of interest 1) MDD knowledge and 2) MDD intention. As per the calculations, the percentage point difference (outcome proportion for the treatment group - outcome proportion for the control group) required is 0.177 for a medium effect size (h = 0.5) for MDD knowledge. For MDD intention, the percentage point difference required for a medium effect size is 0.179.[1]

Power calculations were done for one treatment vs one control.

Outcome Variable	Reference Study for Control group outcome (p1)	p1 (Control)	Medium effect size, Cohen's H = 0.5 (test of proportions)		Sample size req per arm (medium effect size)
			P2 (Treatment)	Delta (p2-p1)	
MDD knowledge	CSBC unpublished study in MP in 2021	0.33	0.507	0.177	121
MDD intention	CSBC unpublished study in MP in 2021	0.55	0.729	0.179	112

[1] We calculated Cohen's h2 (for one-sample) and converted it to Cohen's h for comparison. Cohen's h2 was multiplied by the square root of 2 to find Cohen's h. We set h2= 0.354 for medium effect size (h=0.5)and p1=0.33 for MDD knowledge, and h2= 0.0.368 for medium effect size (h=0.5) and p1=0.55 for MDD intention respectively, and solved for p2 in the following equation:

$$h2 = [2*arcsine(\sqrt{p2})] - [2*arcsine(\sqrt{p1})]$$

Survey eligibility and recruitment

The sample population for this study is mothers, fathers and paternal grandmothers of children under the age of 24 months in Uttar Pradesh.

Eligibility criteria for the sample:
1) The respondent must be over 18 years of age
2) The respondent must be either the mother, father or paternal grandmother of a child under 24 months of age
3) The respondent must live in the same household as the child under 24 months of age (the child must not have been away from the respondent for longer than a month)

We carried out sample recruitment through anganwadi centres across 27 villages. Eligible respondents were recruited with the help of frontline workers in various blocks (eg. anganwadi workers). The frontline workers were informed of the sample recruitment criteria and sample requirement (by strata) before the beginning of data collection. Frontline workers reached out to potential respondents ahead of time informing them about the study and requesting their participation. Based on the data collection schedule, potential respondents will be called to the anganwadi centre in their village at a specified time and date for the study. Since the study sample also included grandmothers and fathers (who might not be regular visitors of the anganwadi centre and might not be able to/willing to visit the centre), sample recruitment was also conducted with the help of NRLM/UP SRLM Livelihood Mission Self-Help Group members in the village, where enumerators visited their homes to conduct the study with respondents in the village.

Randomised exposure to treatments

Respondents were divided into 3 strata based on their relationship with a young children their household - mother, father or paternal grandmother - within the programmed survey form on SurveyCTO. Respondents from each strata are assigned to one of 4 arms (Narrative Series, Control 1, Song Adaptations, and Control 2) with an equal probability by an embedded randomiser within SurveyCTO.

Data Collected via Self Reports

- MDD knowledge
- Attitudes towards MDD for young children
- Intentions to practise MDD behaviours for young children
- Recall of MDD behaviours for young children residing in the same household as the respondent (e.g initiation of diet diversity, types of food fed to the child (food groups) etc)
- Decision making capacity/ability with regard to the child's feeding practices
- Assumptions (norms surrounding MDD practice in the community)
- Levels of transportation, engagement, identification with the videos
- Comprehension of and engagement with the treatment/control videos
- Frequency of exposure to media
- Demographics

Coding of Survey Data

We will use Confirmatory Factor Analysis (CFA) to aggregate the answers for our six MDD knowledge questions into a single measure of MDD Knowledge. The individual variables are shown in Table 1 along with the aggregated "latent variable". Similarly, we will combine answers to 5 individual questions using CFA to create a single latent variable to measure an individual's Knowledge about the consequences of not following MDD. The answers to two questions will be combined using CFA to form a single measure for Attitudes about healthy feeding. These outcome variables will be numerical, ranging from 0 to 1. Our three primary outcomes that do not require aggregation are binary, taking either 0 or 1, and measure intentions around feeding young children in respondents' households.

Table 1: Primary outcome variables

Variable	Latent Variable (CFA*)	Question	Score	Measure
Knowledge: MDD initiation	MDD Knowledge	Month when complementary feeding should begin	Correct answer (At 6 months) = 1 Otherwise = 0	Numeric Variable
Knowledge: Grains		Cereals, bread or potatoes	Correct answer (Yes) = 1 Otherwise = 0	
Knowledge: Seasonal Vegetables		Red and yellow fruits and vegetables		
Knowledge: Meat		Meat and fish		
Knowledge: Leafy Vegetables		Green leafy vegetables		
Knowledge: Condiments		Spices and pickles	Correct answer (No) = 1 Otherwise = 0	
Knowledge: No MDD affects growth	Knowledge about consequences of not following MDD	No food apart from breastmilk, affects long-term growth	Completely correct = 1 Highly correct = 0.75 Fairly correct = 0.50 Slightly correct = 0.25 Not at all correct = 0 -99 Don't know/Can't say = 0	Numeric Variable
Knowledge: No MDD affects learning		No food apart from breast milk, affects learning		
Knowledge: No MDD affects strength		No food apart from breast milk, affects physical strength		
Knowledge: Food may cause choking		Food, apart from breastmilk, might choke young child	Completely correct = 0 Highly correct = 0.25 Fairly correct = 0.50 Slightly correct = 0.75 Not at all correct = 1	

Variable	Latent Variable (CFA*)	Question	Score	Measure
Food may cause: Diarrhoea		Food, apart from breastmilk, might result in diarrhea	-99 Don't know/Can't say = 0	
Attitude: Variety	**Attitudes about what is healthy feeding**	Believe variety is important	Completely correct = 1 Highly correct = 0.75 Fairly correct = 0.50 Slightly correct = 0.25 Not at all correct = 0 Don't know/Can't say = . "Missing"	Numeric Variable
Attitude: Giving health food made for adults		Believe in giving all healthy food made for adults at home		
Intention: Giving food made for everyone at home	NA	Foods made at home for everyone	Yes = 1 No = 0 Don't know/Can't say = "Missing"	Analyse each intention outcome separately Binary (0,1)
Intention: Diverse types of food	NA	Diverse types of foods		
Intention: Buy diverse fruits and vegetables	NA	Buy diverse fruits and vegetables		

Table 2: Reactions to treatment and control videos

Indicator	Latent Variable	Question	Score	Variable Type
Assumptions/ Manipulation Checks				
Novelty	Narrative technique	Kind of videos that are usually shown to you by AWW workers/ASHA workers.	Completely correct = 0 Highly correct = 0.25 Fairly correct = 0.50 Slightly correct = 0.75 Not at all correct = 1	Numeric Variable
Engagement		Impatient to know the ending	Completely correct = 1 Highly correct = 0.75 Fairly correct = 0.50 Slightly correct = 0.25 Not at all correct =0	
Transportation		Experiencing what the characters were going through		
Relatability	n/a	Learnings can apply to everyday life.	Completely correct = 1 Highly correct = 0.75 Fairly correct = 0.50 Slightly correct = 0.25 Not at all correct =0	Numeric Variable
Outputs				
Message	n/a	Main message of the video(s)	Correct answer (young children should be given a diverse range of nutritious foods) = 1 Otherwise = 0	Binary Variable
Distraction	n/a	Something else on mind while watching	Completely correct = 0 Highly correct = 0.25 Fairly correct = 0.50 Slightly correct = 0.75	Numeric Variable

Indicator	Latent Variable	Question	Score	Variable Type
			Not at all correct = 1	
Entertaining	n/a	Respondent's emotions/feeling towards the videos	Entertaining = 1 (Entertaining/Fun, Happy/Enjoyable) Otherwise = 0	Binary Variable
Comprehend	n/a	Comprehension of the video(s) (*separate comprehension question for each treatment/control arm*)	Correct answer = 1 Otherwise = 0	Binary Variable
Influence	n/a	Changed way of thinking	Completely correct = 1 Highly correct = 0.75 Fairly correct = 0.50 Slightly correct = 0.25 Not at all correct =0	Numeric Variable
Shareability	n/a	Willingness to share videos with others	Yes = 1 No = 0 Don't know/Can't say = 0	Binary Variable

Covariates

We collected demographic variables and previous MDD behaviour to serve as covariates, based on literature review linking socio-demographic status, education, family structure to young children's diets (Bhati et al., 2022)[2] (Ogechi & Chilezie, 2017)[3]. Additionally, the revelation of MDD feeding practices could introduce a cognitive dissonance for parents - particularly those who learn that they have been doing something very important incorrectly. Thus we also control for pre-experiment eating habits. See Table 3 for a summary of all covariates.

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[2] Bhati, D., Tripathy, A., Mishra, P. S., & Srivastava, S. (2022, December 27). Contribution of socio-economic and demographic factors to the trend of adequate dietary diversity intake among children (6–23 months): Evidence from a cross-sectional survey in India - BMC Nutrition. SpringerLink. Retrieved April 26, 2023, from https://link.springer.com/article/10.1186/s40795-022-00655-z#citeas

[3] Ogechi, U. P., & Chilezie, O. V. (2017). Assessment of Dietary Diversity Score, Nutritional Status and Socio-demographic Characteristics of Under-5 Children in Some Rural Areas of Imo State, Nigeria. Malaysian Journal of Nutrition.

Table 3: Covariates

Indicator	Question	Score	Variable Type
Diet diversity practice	Diet diversity practised (foods fed to the child apart from breastmilk, medicine and water)	Score: Yes and Age 6 to 24 months = 1 No and Age less than 6 months = 1 Yes and Age less than 6 months = 0 No and Age 6 to 24 months = 0	Numeric Variable
Eats grains	Food made from cereals, rice, potatoes etc.		
Eats pulses	Pulses		
Eats nuts	Nuts and seeds		
Drinks animal milk	Animal milk		
Drinks milk products	Milk products		
Eats meat	Meat and Fish		
Eats eggs	Eggs		
Eats green vegetables	Dark green leafy vegetables		
Eats red, yellow fruits, vegetables	Seasonal Dark yellow and orange fruits and vegetables		
Eats other vegetables	Other vegetables		
Eats other fruits	Other fruits		
Eats ghee	Ghee, butter, oil etc.		

Indicator	Question	Score	Variable Type
Eats other foods	Other/foods other than the items listed		
Eats fried food	Fried snacks such as *pakodas and samosas*	Score: Yes and Age 6 to 24 months = 0 No and Age less than 6 months = 1 Yes and Age less than 6 months = 0 No and Age 6 to 24 months = 1	
Eats pickles	Pickles and other condiments		
SHG Membership	Self help group member in household	Nobody = 0 Otherwise = 1	Variable type: Binary (0,1)
Relationship with child	Respondent's relationship with the child	Father = 1 if father = 0 otherwise	Variable type: Binary (0,1)
		Grandmother = 1 if grandmother = 0 otherwise	
		Mother = 1 if mother = 0 otherwise	
Age***	Age	[integer]	Variable type: Continuous
Role in Nutritional Care	Involved in young child nutritional care	Yes = 1 No = 0 Don't know/Can't say =0	Variable type: Binary (0,1)
Education Level	Highest education level completed is less than grade 8	If yes = 1 Otherwise = 0	Variable type: Categorical
	Highest education level completed is primary school	If yes = 1 Otherwise = 0	Variable type: Categorical
	Highest education level completed is Grade 10	If yes = 1 Otherwise = 0	Variable type: Categorical

Indicator	Question	Score	Variable Type
	Highest education level completed is high school	If yes = 1 Otherwise = 0	Variable type: Categorical
	Highest education level completed is graduate degree or higher	If yes = 1 Otherwise = 0	Variable type: Categorical
	Don't know/Can't say	If yes = 1 Otherwise = 0	Variable type: Categorical
Employed	Earnings status	Does not work for wages or salary = 0 (Housewife, Do not work outside for wages) Works for wages or salary = 1	Variable type: Binary (0,1)
Housewife	Person is a housewife	Male = 0 Not currently a housewife = 0 Primary work is being housewife= 1	Variable type: Binary (0,1)
Single parent	Marital status	Unmarried and (father or mother)= 1 Divorced/separated and (father or mother) = 1 Widowed and (father or mother) = 1 Otherwise = 0	Variable type: Binary (0,1)
Grandmother at home	Family members that live in the same house as the young child	Grandmother at home = 1, if grandmother lives in the same house, Otherwise = 0	Variable type: Binary (0,1)
Father or mother not at home	Parents do not live in the same house as the young child	Young child's father or young child's mother live in the same house= 0 Otherwise = 1	Variable type: Binary (0,1)
Monthly income	Don't know/Can't say	If yes = 1 Otherwise = 0	Variable type: Binary (0,1)
	INR 5000 or less	if yes = 1	Variable type:

Indicator	Question	Score	Variable Type
		Otherwise = 0	Binary (0,1)
	INR 5001 to INR 10000	if yes = 1 Otherwise = 0	Variable type: Binary (0,1)
	INR 10001 to INR 15000	if yes = 1 Otherwise = 0	Variable type: Binary (0,1)
	INR 15001 to INR 20000	if yes = 1 Otherwise = 0	Variable type: Binary (0,1)
	INR 20000 to INR 25000	if yes = 1 Otherwise = 0	Variable type: Binary (0,1)
	Greater than INR 25000	if yes = 1 Otherwise = 0	Variable type: Binary (0,1)
Non-Hindu	Religion	Non-Hindu = 0 (Hinduism) Otherwise = 1	Variable type: Binary (0,1)
Non-General	Caste category	Non-General = 0 (General) Otherwise = 1	Variable type: Binary (0,1)
Self-administered survey	CAPI, Self-administered survey or both	Self-administered = 1 Otherwise (CAPI, Both) = 0	Variable type: Binary (0,1)
Location: Block	Sewapuri	If the respondent participated in the study in this block = 1 Otherwise = 0	Variable type: Binary (0,1)
	Chiraigaon	If the respondent participated in the study in this block = 1 Otherwise = 0	Variable type: Binary (0,1)
Location: AWW Centre/Village	We will create location wise dummy variables (1,0) for each village/AWW Centre	If the respondent participated in the study in the particular village = 1 Otherwise = 0	Variable type: Binary (0,1)

Indicator	Question	Score	Variable Type
Empirical expectation of MDD in village	How many people in your community feed infants between 6-24 months only breastmilk and no solid or semi-solid food?	Empirical expectation for MDD = 0 (Nobody, Some people), Otherwise = 1	Variable type: Binary (0,1)
Fear in decision making	Worry that family will be upset if you seek information from an outside source	Decision Making Fear = 0 (Not worried at all, A little worried) Otherwise = 1 (Fairly worried, Very worried,Extremely worried)	Variable type: Binary (0,1)
Primary Decision Maker	Primary Decision Maker regarding the child's diet is mother	Decision Maker = 1 (Mother) Other = 0	Variable type: Binary (0,1)
Maternal influence on the young child's diet	Mother has high influence on the young child's diet	Mother's influence = 1 (High influence, Complete influence) Otherwise = 0	Variable type: Binary (0,1)
Paternal influence on the young child's diet	Father has high influence on the young child's diet	Father's influence = 1 (High influence, Complete influence) Otherwise = 0	Variable type: Binary (0,1)
Paternal grandmother's influence on the young child's diet	Paternal grandmother has high influence on the young child's diet	Grandmother's influence = 1 (High influence, Complete influence) Otherwise = 0	Variable type: Binary (0,1)

*** The age of the child the respondent is filling out the survey for; i.e the youngest child/grandchild (over 6 months of age **OR** in case the respondent does not have any children over 6 months of age, the eldest child under the age of 6 months)

3. MAIN ANALYSIS METHODS

Our research question is: Are knowledge, attitudes or intentions to adhere to MDD practices higher among those who are shown edutainment videos?

We will compare self-reported measures in each treatment arm compared to its control arm, to assess

1. Knowledge about MDD
2. Knowledge about consequences of not following MDD
3. Attitudes towards MDD
4. Intentions towards MDD
5. Influence of the videos on stated way of thinking about young child feeding
6. Willingness to share videos watched

Pooled data from both experiments

First we pool all data (across videos and strata) and compare the effect of the videos on knowledge, attitude and intention scores between:
- Narrative Series and Control 1
- Song Adaptations and Control 2

We will use OLS regression when the dependent variable is numerical and Logit regression for the binary dependent variable. Our OLS models will be:

(1a) $Y_i = \beta_0 + \beta_1 X_i + \Gamma_j + u_i$

(1b) $Y_i = \beta_0 + \beta_1 X_i + \gamma_i + \Gamma_j + u_i$

Where,

  Y_i = Outcome
  i = indexes individual respondents
  β_0 = Intercept
  β_1 = Coefficient of interest
  X_i = Treatment (assigned to narrative series or song adaptations)
  Γ_j = Fixed effect of session
  j = indexes sessions
  u_i = error

In our second specification of this model (1b), we will control for the covariates listed in Table 3. The vector of covariates is represented by γ_i.

(2b) $\text{Logit}(\pi_i) = \beta_0 + \beta_1 X_i + \gamma_i + \Gamma_j + u_i$

Where,

  π = probability that outcome is 1
  β_0 = Intercept
  β_1 = Treatment coefficient
  X_i = Treatment (assigned to narrative series or song adaptations)
  γ_i = Covariates for the ith subject in Control / Treatment arm
  Γ_j = Fixed effect of session
  i = indexes individual respondents
  j = indexes sessions
  u_i = error

Second, we will examine the treatment videos individually, comparing *Tales of Mazrupur* with control 1 and *Khaan Paan Gaan* with control 2. This will allow us to answer a more specific question - Is each treatment alone effective at increasing KAI, or is the general result dependent on the success or failure of one treatment/technique?

To implement this, we will use the same models detailed above, but use each sub-experiment's data individually.

4. MANIPULATION CHECKS

We added questions to our surveys to confirm that our manipulations were successful, that is, intervention videos were different from the controls in terms of meeting the assumptions in our Theory of Change. We test this using the same models as above (2a and 2b), replacing the outcome of interest with the intermediary outcomes shown in Table 2.