

Effect of a National Nutrition Communications Campaign on Stunting Awareness and Promotion of Exclusive Breastfeeding Behavior among Rural Indonesian Mothers

Ryan Moffat¹⁾, Alexis Sayer¹⁾, Megan Hawks¹⁾, Kiersten DeCook¹⁾,
McKayla Traub¹⁾, Mary Linehan²⁾, Kirk Dearden²⁾, Cut Novianti Rachmi³⁾,
Josh West¹⁾, Benjamin Crookston¹⁾, Cougar Hall¹⁾

¹⁾Department of Public Health, Brigham Young University, Provo, Utah, USA

²⁾IMA World Health, Washington DC, USA

³⁾Faculty of Medicine, Universitas Padjadjaran, West Java, Indonesia

ABSTRACT

Background: Stunting affects 37% of Indonesian children and has lifelong consequences for the affected child. Childhood stunting can be prevented by promoting exclusive breastfeeding (EBF) and helping mothers overcome barriers to EBF. This study aimed to examine the effect of a National Nutrition Communications Campaign (NNCC) on stunting awareness and promotion of exclusive breastfeeding behavior among rural Indonesian mothers.

Subjects and Method: Data came from interviews and a cross-sectional survey of 1,740 mothers with children under the age of 2 in three Indonesian districts, from November 2015 to March 2018. Measures included exposure to two different NNCC interventions: multi-media messages (media) and interpersonal communication strategies (IPC) and associations with stunting knowledge, breastfeeding knowledge, and breastfeeding perceptions/intentions. The data were analyzed by a multiple logistic regression.

Results: Exposure to NNCC was positively associated with knowledge toward EBF (OR= 1.56; 95% CI= 1.10 to 2.19; p= 0.043), awareness of the importance of nutrition during the first 1000 days of life (OR= 1.90; 95% CI= 1.43 to 2.52; p<0.001), and having heard of stunting (OR= 1.93; 95% CI= 1.41 to 2.63; p<0.001). Exposure to IPC was positively associated with knowledge toward EBF (OR=1.78, CI95% 1.37 to 2.30, p<0.001), awareness of the importance of nutrition during the first 1000 days of life (OR= 3.02; 95% CI= 2.40 to 3.80; p<0.001), knowledge of EBF benefit to prevent stunting (OR= 3.05; CI 95%= 2.33 to 3.98; p<0.001), and having heard of stunting (OR= 3.15; CI 95%= 2.49 to 3.98; p<0.001). Exposure to IPC was a significant predictor of an intention to engage in EBF (p <0.050).

Conclusion: These findings point to practical recommendations for national level social and behavior change communication efforts. Future campaigns should aim to be inclusive of: 1) mass media (television, radio, billboards, and social media) to promote health as these efforts provide for wide exposure while maintaining impact; and 2) IPC (face-to-face communications, classes, and support groups) as these efforts increase knowledge and impact on behavior, beliefs and intentions.

Keywords: stunting, exclusive breastfeeding, communications campaign

Correspondence:

Ryan Moffat. Brigham Young University, Provo, UT, USA. Email: ryancmoffat@gmail.com. Mobile: (801)792-9800.

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BACKGROUND

Stunting is defined as a low height-to-age ratio that falls below -2 standard deviations of the World Health Organization (WHO) international reference median value for child growth standards for age and sex (De Onis et al., 2000). Essentially irreversible after the age of five (Crookston et al., 2013), stunting is the outcome of inadequate nutrition and repeated infections during the early development of a child, specifically the first 1000 days of life – from conception until age two (Victora, 2010). Childhood stunting has life-long consequences and has been linked to increased susceptibility to disease, premature death (Black et al., 2008), reduced cognitive functioning (Crookston et al., 2011), poor performance in school, delays in motor development (Victora, 2010), and reduced productivity in the workplace (Alderman and Behrman, 2006; World Health Organization, 2017).

Globally, 22.2% of children under the age of 5 are stunted. More than half of these 149 million children reside in Asia. Despite significant continent-wide reductions in stunting prevalence over the past 25 years, 25% of Asian children under the age of five remain stunted (World Bank, 2017). Rates of childhood stunting vary both by country and within countries. Stunting affects 37% of children in Indonesia, where the greatest prevalence is found in rural areas (Rachmi et al., 2016). Stunting in Indonesia is associated with a combination of complex factors, including hygiene and childcare practices (characterized by poor dietary diversity and sub-optimal food safety and feeding practices), low maternal and paternal education, inadequate maternal nutrition, lower per-head household expenditure, low birth-weight, insufficient birth spacing, open defecation, household food insecurity, and low levels of exclusive breastfeeding (Rachmi et al., 2016; Semba et al, 2008; Torlesse et al.,

2016). While breastfeeding provides infants with all of the nutrition they need for the first 6 months of life (Bozkurt et al., 2020) and is an effective defense against stunting in resource-poor settings, rates of exclusive breastfeeding (EBF) remain low in Indonesia where it has been reported that only 46% of women in Indonesia engage in EBF for the first 6 months (Ananta et al., 2016).

Promoting EBF and helping mothers overcome barriers to EBF are effective stunting prevention strategies. Barriers may include a lack of knowledge about the importance of EBF, unfavorable cultural or social norms and beliefs related to EBF, real and perceived barriers to EBF based on a mother's daily responsibilities, skills, and being of lower socioeconomic status (Beyene et al., 2015; Ng et al, 2012). A recent report states that women in Indonesia believe breastmilk and formula are equally healthy (Belvedere et al., 2018). Approximately two-thirds of girls and 58.2% of boys were breastfed in the first hour of birth. Boys were more likely to be given supplemental food other than milk in the first 3 days of life than girls, which is associated with the cultural belief that boys need better nutrition than girls (Belvedere et al., 2018). To improve EBF rates in rural Indonesia, it is recommended that women be educated on the importance of EBF and its ability to prevent stunting (Victora, 2010). Semba et al. (2008) note that mothers in Indonesia are generally the primary caregivers for children and that maternal education is associated with protective behaviors supportive of proper child health and development.

The Theory of Planned Behavior provides a useful framework for understanding and predicting health behavior generally and presents valuable constructs for social and behavior change interventions (Ajzen, 1991). According to the TPB the best predictor of an individual's behavior is her

behavioral intention, which is determined by the theory's three main constructs: 1) the individual's attitudes and beliefs toward the behavior (e.g., whether the individual believes that EBF for the first 6 months of life is important or necessary); 2) perceived subjective and social norms (e.g., whether the individual believes that important others approve or are supportive of EBF and that EBF is supported generally by society and peers); and 3) perceived behavioral control (e.g., whether the individual believes she has the ability to engage in EBF). The TPB can add clarity and understanding to engagement in EBF directly and indirectly by measuring attitudes, beliefs, and values regarding this practice as well as an individual's perception of subjective norms and subsequent social pressures to adhere to EBF for the first 6 months, and the level of confidence or self-efficacy an individual feels with regard to her ability to only breast-feed for the first 6 months.

A recent social and behavior change communication effort in Indonesia, known as the National Nutrition Communication Campaign (NNCC), sought to educate the public on stunting, including the protective effects of EBF. Consistent with the TPB, the NNCC targeted attitudes and beliefs of mothers related to EBF by increasing knowledge of necessity of EBF and the preventative impact that EBF has on childhood stunting, aimed to increase subjective and social norms supportive of EBF, and sought to increase Indonesian mothers' confidence for engaging in EBF. Between 2014 and 2018 the NNCC targeted 10 provinces across the Indonesian archipelago and included both mass media communications (television, radio, social media) and interpersonal communication (IPC) approaches. Generally, IPC strategies include a face-to-face verbal two-way communication inclusive of listening, dialoguing and actioning

(Adewuyi and Adefemi, 2016). In particular, IPC interventions included in the NNCC focused on health workers communicating to mothers and caregivers the importance of EBF for the first 6 months of life, providing appropriate complementary foods according to child's age, providing a sufficient amount of food, feeding frequently, inclusion of animal-source foods in the diet, and proper hygiene. Channels for the delivery of NNCC IPC messages included women's groups, maternal health classes, and Posyandu (integrated health post) services for primary health care throughout rural Indonesia. The purpose of this study was to analyze the effectiveness between both media and IPC interventions employed by the NNCC in changing knowledge related to stunting, the importance of nutrition during the first 1000 days of life, and the importance of EBF. The study also sought to understand how exposure to NNCC interventions impacted perceptions and behavioral intentions of EBF among rural Indonesian mothers. In particular, this study aimed to answer the following research questions: 1) What was the association between exposure to NNCC media messages and EBF-related knowledge, perceptions, and intentions? 2) What was the association between exposure to NNCC IPC interventions and EBF-related knowledge, perceptions, and intentions? 3) What was the association between exposure to both NNCC media messages and IPC interventions and EBF-related knowledge, perceptions and intentions?

SUBJECTS AND METHOD

1. Study Design

Data for this study were collected through a cross-sectional survey of mothers of children aged 0-2 years in three randomly selected rural Indonesian districts (i.e., Banyuasin, Kubu Raya, and Katingan) located in three provinces (South Sumatera,

West Kalimantan, and Central Kalimantan) from November 2015 to March 2018.

2. Population and Sample

A multi-level sampling strategy was used to construct the study sample. Within each of the three rural districts, 30 villages were randomly selected, and each represented a cluster unit. At a more local level, four sub-villages were randomly selected from within each of the 30 villages, in each of the three districts. Finally, five mothers were selected from each sub-village. The target sample size from each of the three districts was 600 mothers, 1800 overall. Using this method, a study sample was selected to include a total of 1734 mothers of children under two years of age. Specific regions were selected for this study because of the high prevalence of stunting and perceived lack of stunting awareness.

3. Study Variables

Study variables included beliefs and perceptions related to stunting and breastfeeding, stunting knowledge, nutritional practices, exposure to media programming, and exposure to IPC programming.

4. Definition of Variables

Beliefs and perceptions of breastfeeding were defined by the importance, intention, difficulty of, and support for, EBF. Knowledge of stunting was defined by a knowledge of the term and prevention strategies as well as knowledge and opinion of the “First 1000 Days of Life.” Current breastfeeding practices were defined as EBF during the first three days of life, introduction of foods beyond breastmilk, and current breastfeeding. Media exposure was defined by having viewed and being able to describe the theme or message in the commercial, print media or social media. IPC exposure was defined by having participated in mothers’ classes or support groups for mothers of children below the age of 2 who meet regularly to share experiences, discuss,

and give support for mother and child’s health primarily related to pregnancy, breastfeeding, and nutrition which was facilitated by the Posyandu.

5. Study Instrument

The study instrument included questions related to demographics and items designed to measure key study variables. Demographic questions included mother’s age, total household income, level of education. Items related to stunting included: 1) whether they had heard of “First 1000 Days of Life;” 2) what their opinion was of the “First 1000 Days of Life;” 3) whether they were familiar with the term “stunting;” and 4) if they knew how to prevent malnutrition. Items related to breastfeeding included: 1) whether EBF was important to them (yes/no); 2) potential difficulties of EBF for the first 6 months of life; 3) their intention with EBF for the first 6 months; and 4) whether they had support from others in their desire to breastfeed). Items related to breastfeeding practices included: 1) whether they are currently breastfeeding their child; 2) whether they had exclusive breastfed for the first three days of life; and 3) when their child was introduced to foods beyond breastmilk. In measuring media exposure, interviewers showed respondents a brief video clip of the TV commercials or an image of the print media or social media page and asked if they had seen the particular media. Exposure was confirmed by asking the respondent to describe the theme or message in the commercial, print media or social media. Respondents were considered to be exposed to the media component with a valid confirmation of exposure to any of the various platforms. Exposure to the IPC component was determined by asking respondents if they had participated in mothers’ classes or support groups for mothers of children below the age of 2 who meet regularly to share experiences, discuss, and give support

for mother and child's health primarily related to pregnancy, breastfeeding, and nutrition which was facilitated by the Posyandu. If participants responded "yes," they were asked to provide a description of the topics of the meetings. Respondents were considered to be exposed to the IPC component following confirmation of exposure to any of the IPC meetings.

Reconstra Utama Integra, a research firm from Jakarta, Indonesia conducted the data collection. Participants took part in a structured interview/survey conducted by trained enumerators, who traveled to the home, acquired consent, and conducted a face-to-face interview with participants. The interviewers asked questions from a structured guide and collected participant responses on the interview guide. Each interviewer was responsible for interviewing six respondents per day and reported to field coordinators, who then verified the responses and uploaded survey data daily. A data manager also checked the data and corrected any errors. Data cleaning was done prior to analysis. Each variable was labeled, and all data was transferred to the statistical data software, SAS, for analysis.

6. Data Analysis

Statistical analyses were conducted using SAS version 9.4. Basic frequency statistics were used to describe the data. Both linear and logistic regression analyses were used to determine relationships between exposure to either the media or IPC components of the campaign and outcomes. The knowledge, attitude and behavior outcome variables

included child's past and current breastfeeding status, onset of breastfeeding after birth, breastfeeding of colostrum during the first 3 days after birth, administration of other foods during the first 3 days after birth, initiation of foods other than breast milk, age at initiation of foods other than breast milk, EBF during the first 6 months of life, knowledge of how to prevent malnutrition, and knowledge of the term stunting. Adjusted models controlled for maternal age, total household income, and level of education.

7. Research Ethics

Research authorization and ethical approval was acquired from the Ethical Research Committee at the Faculty of Public Health, University of Indonesia. Additionally, government approval was obtained from the Ministry of Home Affairs. Participation was voluntary for all subjects. Informed consent forms were signed by each subject prior to participation. Information gathered during the study was kept confidential and used only for the intended research purposes.

RESULTS

The mean age for mothers was 28.9 years. Occupations were varied and included unemployed/ housewives, daily workers, farmers, light traders/shop owners, etc. Approximately 85% were unemployed/ housewives, 4.6% were light traders/shop owners, and 2.8% were farmers. Islam was the primary religion of respondents with 94.6% of mothers identifying as Muslim.

Table 1. Sample Characteristic (N=1,734)

Variables	Frequency	
	N	%
Education		
None	97	5.6
Elementary School	670	38.6
Junior High School	423	24.4
Senior High School	434	25
College/University/Other Higher Ed.	110	6.3
Occupation		
Unemployed/Housewife	1461	84.3
Daily Worker	12	0.7
Industrial Worker	1	0.1
Farmer	49	2.8
Fisher	6	0.4
Military/Police	1	0.1
Wholesalers	8	0.5
Light traders/Shop owners	79	4.6
Government Employee	31	1.8
Private Employee	28	1.6
Driver	0	0
Hunter	0	0
Carpenter/Craftsman	0	0
Other	4	0.2
Religion		
Islam	1640	94.6
Other	94	5.4

The distribution of knowledge pertaining to breastfeeding is represented in Table 2.

Table 2: Knowledge of Mothers of Children Under Age 2 (N=1734)

	N		%	
	Yes	No	Yes	No
Knowledge of First 1000 Day of Life				
Know to provide exclusive breastfeeding for children aged 0-6 months	358	1376	20.7	79.4
Know to provide a variety of and balanced foods for breastfeeding children aged 6-24 months	249	1485	14.4	85.6
Have heard about the importance of the first 1000 days of life	663	1069	38.3	61.7
Knowledge of Stunting				
Know to provide exclusive breastfeeding for the first 6 months of life to prevent stunting	242	1492	14	86
Know to prolong breastfeeding for children up to 2 years of age to prevent stunting	58	1676	3.3	96.7
Know how to prevent undernutrition	1157	577	66.7	33.3
Have heard about stunting	512	1221	29.5	70.5

Knowledge is separated into that of the first 1000 days of life as well as knowledge related to stunting. Approximately 80% of mothers reported not knowing to provide EBF for children age 0-6 months in relation

to the importance of the first 1000 days of life, while 86.0% of mothers reported not knowing to provide EBF for the first 6 months in order to prevent stunting. Two-

thirds of mothers reported knowing how to prevent undernutrition.

Information about relating to beliefs/intentions and behaviors pertaining to EBF are presented in Table 3.

Table 3: Beliefs/intentions and behaviors of mothers of children under age 2 (N= 1,734)

Beliefs/Intentions	Agree		Disagree	
	N	%	N	%
Only giving breastmilk for the first 6 months of life is hard to do	199	11.9	1,479	88.1
Felt the people who are important to me did not encourage me to exclusively breastfeed for the first 6 months	69	4.1	1,607	95.9
Will only give breast milk to child for the first 6 months	1599	95.4	77	4.6
Behaviors	Yes		No	
	N	%	N	%
Child has been breastfed	1,655	95.5	78	4.5
Breastfeeding was initiated within 1 hour after birth	1,198	69.1	536	30.9
First milk (colostrum) was breastfed to child within first 3 days of birth	1,492	87.8	207	12.2
Child was given liquid/food other than breastmilk within first 3 days of birth	733	42.4	996	57.6
Child still breastfeeds	1,434	82.7	300	17.3
Child has been initiated to foods other than breastmilk	1,340	77.3	394	22.7

The majority of respondents reported that only giving breastmilk (EBF) for the first 6 months of life was not difficult to do (88.1%). Nearly all (95.4%) participants reported an intention to only provide their child breast milk (EBF) for the first 6 months. Additionally, approximately 95% of respondents reported that their child had

been breastfed and 69.1% of those mothers had initiated breastfeeding within 1 hour after birth.

Results from unadjusted and adjusted odds ratios of exposures to both media and IPC interventions and their impact on knowledge are displayed in Table 4.

Table 4. Exposure to Media and IPC Interventions and Impact on Knowledge

Part 1 – Media Intervention	Unadjusted			Adjusted		
	OR	95% CI	p	OR	95% CI	p
Knowledge of First 1000 Days of Life						
Know to provide EBF for children aged 0-6 months	1.65	1.19-2.28	0.031	1.56	1.10-2.19	0.043
Know to provide a variety of and balanced foods for breastfeeding children aged 6-24 months	1.27	0.89-1.82	0.111	1.13	0.78-1.63	0.352
Have heard about the importance of the first 1000 days of life	2.05	1.57-2.67	<0.001	1.9	1.43-2.51	<0.001
Knowledge of Stunting						
Know to provide EBF for the first 6 months of life to prevent stunting	1.62	1.11-2.38	0.041	1.47	0.99-2.20	0.087

Know to prolong breastfeeding for children up to 2 years of age to prevent stunting	1.38	0.67- 2.83	0.591	1.22	0.59- 2.54	0.987
Know how to prevent undernutrition	1.49	1.17- 1.90	0.003	1.40	1.08- 1.83	0.045
Have heard about stunting	2.07	1.54- 2.77	<0.001	1.93	1.41- 2.63	<0.001
Part 2 – IPC Intervention						
Knowledge of First 1000 Days of Life						
Know to EBF for children aged 0-6 months	1.87	1.47- 2.38	<0.001	1.78	1.37- 2.30	<0.001
Know to provide a variety of and balanced foods for breastfeeding children aged 6-24 months	1.21	0.91- 1.60	.494	1.1	0.81- 1.47	0.733
Have heard about the importance of the first 1000 days of life	2.94	2.38- 3.63	<0.001	3.02	2.40- 3.80	<0.001
Knowledge of Stunting						
Know to provide EBF for the first 6 months of life to prevent stunting	2.04	1.54- 2.69	<0.001	2.02	1.50- 2.72	<0.001
Know to prolong breastfeeding for children up to 2 years of age to prevent stunting	1.66	0.97- 2.82	0.064	1.33	0.77- 2.33	0.310
Know how to prevent undernutrition	2.91	2.27- 3.73	<0.001	3.05	2.33- 3.98	<0.001
Have heard about stunting	3.01	2.42- 3.74	<0.001	3.15	2.49- 3.98	<0.001

Exposure to the media intervention was positively associated with knowledge of providing EBF for the first 6 months of life in both unadjusted (OR= 1.65, CI= 1.19 to 2.19) models, having heard about the importance of the First 1000 Days of Life in both unadjusted (OR= 2.05, CI= 1.58 to 2.67) and adjusted (OR= 1.9, CI= 1.43 to 2.52) models, and with knowledge pertaining to stunting in regard to knowing to provide EBF for the first 6 months to

prevent stunting in the unadjusted model (OR= 1.62, CI= 1.11 to 2.38). Exposure to the IPC intervention was positively associated with knowing to provide EBF for the first 6 months to prevent stunting for both unadjusted (OR 2.04, CI= 1.54 to 2.69) and adjusted (OR 2.02, CI= 1.50 to 2.72) models.

Table 5 shows the results of linear regression analyses evaluating the relationships for exposure to media and IPC interventions and behavioral beliefs and intentions.

Table 5: Exposure to Media and IPC Interventions and Impact on Beliefs/Intentions

Part 1- Media Intervention	Unadjusted Point Estimate (p)	Adjusted Point Estimate (p)
Only giving breastmilk for the first 6 months of life is hard to do	-0.068 (0.115)	-0.089 (0.053)
Felt the people who are important to me did not encourage me to EBF for the first 6 months	-0.059 (0.070)	-0.074 (0.032)
Will only give breast milk to child for the first 6 months	0.009 (0.782)	-0.005 (0.898)
Part 2- IPC Intervention	Unadjusted Point Estimate (p)	Adjusted Point Estimate (p)
Only giving breastmilk for the first 6 months of life is hard to do	-0.038 (0.316)	-0.044 (0.273)
Felt the people who are important to me did not encourage me to EBF for the first 6 months	-0.054 (0.055)	-0.050 (0.090)
Will only give breast milk to child for the first 6 months	0.066 (0.023)	0.062 (0.041)

Note: Adjusted models include total income, maternal age, maternal education

Media intervention exposure was negatively associated with the belief that the people most important to the respondents did not encourage them to breastfeed for the first 6 months ($p < 0.05$), meaning that media exposure was associated with the belief that most people important to the respondent encouraged EBF for the first 6 months. Exposure to IPC interventions was positively associated with intent to only give their child breast milk (EBF) for the first 6 months of life in both unadjusted and adjusted models ($p < 0.050$).

DISCUSSION

The purpose of this study was to evaluate the association between NNCC interventions on stunting awareness and breastfeeding knowledge, beliefs, and intentions of mothers in rural Indonesia. The findings in this study point to practical recommendations for national social and behavior change communication efforts. This study found that media messages and IPC interventions

were significantly associated with knowledge of the importance of nutrition for the first 1000 days of life (EBF for the first 6 months of life and a diverse diet for breastfeeding children aged 6-24 months) and stunting (having heard of stunting and knowing how to prevent undernutrition). Among these measures of knowledge, NNCC media messages and IPC strategies appear similarly effective. Unlike media messages, IPC strategies were significantly associated with knowing to provide EBF for the first 6 months of life to prevent stunting.

A specific aim of the NNCC was to establish subjective and social norms supportive of EBF, persuading Indonesian mothers and their social support networks to embrace this practice. Although no significant association was found with IPC strategies, exposure to the media intervention in the current study was positively associated with social support for EBF. Social support is a powerful predictor of behavioral intent within the Theory of Planned Behavior (TPB). According to the TPB both perceived

subjective and social norms (e.g., whether the individual believes that important others approve or are supportive of EBF and that EBF is supported generally by society and peers) are powerful predictors of one's intention to engage in a particular health behavior. Media's ability to impact cultural and social norms in the current study is consistent with other studies. In a comprehensive review of media campaigns and health behavior change, Wakefield et al. (2010) note two distinct ways in which media sways subjective and social norms. First, is agenda setting. Mass media campaigns increase the frequency, depth, or both, of interpersonal discussion about a particular health issue with an individual's social network, which, in combination with individual exposure to messages, might reinforce specific changes in behavior". Second, and through a much more peripheral route, health behaviors promoted by mass media gradually become normative within an individual's social network and thus influence beliefs, perceptions, and behaviors without the individual being directly exposed to the campaign (2010).

Particularly relevant to the current study, a review by Snyder (2007) concluded that media campaigns in developing countries have been especially effective in promoting breastfeeding. The most effective of these campaigns helps populations transition from preliminary stages of behavior change readiness, typically by increasing awareness and foundational knowledge, of a specific behavior and its associated consequences (Snyder, 2007). Formative research gathered prior to planning the NNCC was interpreted through the context of the Transtheoretical Model of Change (Prochaska and Velicer, 1997) and revealed that a majority of Indonesian mothers were in the pre-contemplation stage and were mostly unaware of, or had never heard of or

considered, stunting as a serious health issue (IMA, 2019). NNCC media and IPC interventions thus aimed to increase knowledge of both nutrition during the first 1000 days of life (EBF for the first 6 months of life followed by the need to provide a diverse diet for breastfeeding children aged 6-24 months) and stunting.

The NNCC also sought to increase self-efficacy for engaging in EBF and a diverse diet for breastfeeding children aged 6-24 months. Neither the media intervention nor the IPC intervention was associated with a belief that only giving breastmilk for the first 6 months of life is hard to do. Hence, exposure to NNCC messages was associated with mothers perceiving that EBF for the first 6 months of life is not difficult, or that, in other words, this behavior is doable. These findings are similar to other related studies. A study in Ethiopia found that exposure to social and behavior change communication interventions helped improve feeding practices among infants and young children (Kim et al., 2016). A similar study examined the impact of IPC interventions in particular on feeding practices for infants and young children in Bangladesh, Vietnam, and Ethiopia. Findings from Vietnam demonstrate that exposure to IPC interventions alone or with other mass media interventions are associated with a greater likelihood of EBF (Kim et al., 2020).

Study results suggest that exposure to IPC interventions, such as face-to-face communication, group and class discussion, and support group settings are a successful strategy for improving intentions related to EBF. Behavioral intentions are, according to the TPB, a product of normative beliefs related to the expected outcome of a behavior, subjective and social norms supportive of the behavior, and perceived behavior control or self-efficacy for the behavior. The current study did not endeavor to measure

each construct of the TPB in predicting behavioral intention. Rather the current study utilizes the TPB in explaining how NNCC interventions, both media and IPC, may have impacted the intention of Indonesian mothers to engage in EBF.

Future campaigns designed to promote EBF should include mass media (television, radio, billboards, and social media as appropriate to the setting) as these platforms provide for wide exposure while maintaining short-term impact and long-term outcomes. Such interventions should include extensive formative research to ensure proper messaging and media platforms that are culturally specific and tailored to the target audience. Such interventions should seek to increase knowledge in an attempt to improve attitudes and beliefs supportive of EBF, establish or clarify subjective and social norms supportive of EBF, and increase a mother's feelings of perceived behavioral control or self-efficacy EBF. In doing so, future campaigns should promote EBF with a degree of caution, remaining sensitive to the challenges and needs of mothers who are unable to breast-feed. When possible, interventions should also include IPC (face-to-face communications, classes, and support groups) as these efforts have the ability to reach individuals who may be missed by mass media and are similarly effective at increasing knowledge, impacting perceptions, while especially effective at increasing skills for improving self-efficacy.

Social and behavior change efforts should be culturally responsive and context specific. Extensive formative research was conducted by IMA World Health and its partners in designing the components of the NNCC. Formative research is essential in tailoring comprehensive and context-specific social and behavior change strategies and messages (Kim et al., 2016). IMA World

Health identified that both media resources and IPC messages would need to be based on a clear understanding of the needs, perceptions and knowledge of mothers gained from formative results. This first phase effort in gathering formative data, while requiring enormous resources, was key to designing media and IPC interventions with the ability to impact knowledge, beliefs, and behaviors supportive of EBF and stunting prevention.

Future research should be conducted to better understand the social, economic, and familial EBF barriers for women in Indonesia in order to better understand how to increase self-efficacy for EBF and identify approaches to motivate women to overcome challenges. Additional research is needed to better understand the positive and negative impacts of media campaigns in developing countries to determine how these interventions can be fine-tuned to avoid shaming mothers unable to engage in EBF.

This study has several limitations. Data was gathered from only three Indonesian districts in rural areas and may not be representative of the entire Indonesian population. Self-reporting errors may be present in relation to the cross-sectional survey and interviews that were used to collect the data; respondents may have been hesitant to respond accurately due to social stigma or pressure. Additionally, this study did not use an asset index to measure poverty, which is generally regarded as a more accurate indicator of wealth in developing settings. Since the indicators necessary to construct such an index were not included the study survey, a measure of total household income was used instead. Finally, while study results are loosely framed within the TPB, the study was questionnaire was not designed with this theoretical framework in mind.

Findings from this study suggest that NNCC media messages provide a potentially

effective way of disseminating knowledge on the need for EBF and providing a diverse diet for breastfeeding children aged 6-24 months. NNCC media messages were also found to be an effective means of promoting awareness of both stunting and the importance of nutrition during the first 1000 days of life. NNCC IPC interventions were found to promote knowledge of both the need for EBF and the role of EBF in the prevention of stunting. Findings further suggest that IPC interventions were related to women intending to engage in EBF. Utilizing a combination of media and IPC interventions may therefore play an important role in the dissemination of knowledge – and thus the fostering of beliefs supportive of EBF, increasing subjective and social norms supportive of EBF and increasing self-efficacy for EBF.

AUTHOR CONTRIBUTIONS

Ryan Moffat contributed to data analysis, drafted the methods and discussion section and critically revised the manuscript. Alexis Sayer contributed to data analysis, drafted the methods and discussion section and critically revised the manuscript. Megan Hawks contributed to data analysis and supervised activities of authors. Kiersten DeCook contributed to data analysis, drafted the background section and critically revised the manuscript. McKayla Traub contributed to data analysis, drafted the background section and critically revised the manuscript. Mary Linehan contributed to conception, design and data analysis, and critically revised the manuscript. Kirk Dearden contributed to conception, design and data analysis and critically revised the manuscript. Cut Novianti Rachmi contributed to conception and design, gathered data, and critically revised the manuscript. Josh West contributed to conception and design, completed the statistical analysis,

and critically revised the manuscript. Benjamin Crookston contributed to conception and design, completed the statistical analysis, and critically revised the manuscript. Cougar Hall contributed to conception and design, analysis, and critically revised the manuscript.

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CONFLICTS OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

REFERENCE

- Adewuyi E, Adefemi K (2016). Behavior change communication using social media: A review. *Int J Commun and Health*. 9: 109-116. DOI: <https://orcid.org/0000-0002-4533-0340>.
- Alderman H, Behrman JR (2006). Reducing the incidence of low birth weight in low-income countries has substantial economic benefits. *World Bank Res Obs*. 21(1): 25-48. DOI: <https://doi.org/10.1093/wbro/lkj001>.
- Ananta Y, Gandaputra E, Waiman E, Partiw I, Marzuki N, Yohmi E, Panjaitan E, et al. (2016). Exclusive breastfeeding rate and factors associated with infant feeding practices in Indonesia. *PAEDIATR INDONES*. 56(1): 24-31. DOI: <https://doi.org/10.14238/pi56.1.20-16.24-31>
- Azjen I (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50: 179-

211. [https://doi.org/10.1016/0749--5978\(91\)90020-T](https://doi.org/10.1016/0749--5978(91)90020-T).
- Belvedere L, Andreasen R, Smith R, Thomas K, Sever T, Syafiq A, Crookston B, et al. (2018). Facts from Barriers to Optimal Breastfeeding in Rural Indonesia. *Archives of Epidemiology*, AEPD-124. DOI: 10.29011/2577-2252.100024
- Beyene M, Worku A, Wassie M (2015). Dietary diversity, meal frequency and associated factors among infant and young children in Northwest Ethiopia: a cross-sectional study. *BMC Public Health*, 15: 1007. <https://doi.org/10.1186/s12889-015-2333-x>.
- Black RE, Allen LH, Bhutta ZA, Caulfield LE, De Onis M, Ezzati, M, Mathers C, et al., (2008). Maternal and child undernutrition: global and regional exposures and health consequences. *The Lancet*.- 371(9608): 243-260.
- Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, Mathers C, Rivera J (2008). Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet*. 371(9608): 24-3-60. DOI: 10.1016/S0140-6736(07)6-1690-0.
- Bozkurt E, Bozkurt HB (2020). Relationship between ocular morbidity and infant nutrition. *Breastfeeding and Formula Feeding Infants*. IntechOpen. 1-12. DOI: 10.5772/intechopen.92162.
- Crookston BT, Dearden KA, Alder SC, Porucznik CA, Stanford JB, Merrill RM, Dickerson TT, et al. (2011). Impact of early and concurrent stunting on cognition. *Matern Child Nutr*. 7(4): 397-409. DOI: 10.1111/j.1740-8709.-2010.00255.x.
- Crookston B, Schott W, Dearden K, Georgiadis A, Penny M, Lundeen E, Behrman J, et al., (2013). Post-infancy growth, schooling, and cognitive achievement: Young Lives. *Am J Clin Nutr*. 98(6): 1555-1563. DOI: 10.3945/ajcn.113.06-7561
- Onis M, Frongillo EA, Blössner M (2000). Is malnutrition declining? An analysis of changes in levels of child malnutrition since 1980. *Bull World Health Organ*. 78(10): 1222-33.
- Kim SS, Nguyen PH, Tran LM, Alayon S, Menon P, Frongillo EA (2020). Different combination of behavior change interventions and frequency of interpersonal contacts are associated with infant and young child feeding practices in Bangladesh, Ethiopia, and Viet Nam. *Curr Dev Nutr*. 4(2): nnz140. DOI: 10.1093/cdn/nzz140.
- Kim SS, Rawat R, Mwangi EM, Tesfaye R, Abebe Y, Baker J, Frongillo EA, et al. (2016). Exposure to large-scale social and behavior change communication interventions is associated with improvements in infant and young child feeding practices in Ethiopia. *PLoS One*. 11(10): e0164800. DOI: 10.1371/journal.pone.0164800.
- Ng C, Dibley M, Agho K (2012). Complementary feeding indicators and determinants of poor feeding practices in Indonesia: a secondary analysis of 2007 Demographic and Health Survey data. *Public Health Nutrition*, 15(5): 827-839. doi: 10.1017/s13689800110-02485.
- Ng CS, Dibley MJ, Agho KE (2012). Complementary feeding indicators and determinants of poor feeding practices in Indonesia: a secondary analysis of 2007 Demographic and Health Survey data. *Public Health Nutr*. 15(5): 827-39. DOI: 10.1017/S13689800110024-85.
- Prochaska JO, Velicer WF (1997). The trans-theoretical model of health behavior

- change. *Am J Health Promot.* 12(1): 38-48. DOI: 10.4278/0890-1171-12.1.-38.
- Rachmi CN, Agho KE, Li M, Baur LA (2016). Stunting, underweight and overweight in children aged 2.0–4.9 years in Indonesia: prevalence trends and associated risk factors. *PloS one.* 11(5). <https://doi.org/10.1371/journal.pone.0154756>.
- Rosenstock IM, Strecher VJ, Becker MH (1998). Social learning theory and the Health Belief Model. *Health Educ Q.* 15(2): 175-83. DOI: 10.1177/10901981-8801500203.
- Saha KK, Frongillo EA, Alam DS, Arifeen SE, Persson LÅ, Rasmussen KM (2008). Appropriate infant feeding practices result in better growth of infants and young children in rural Bangladesh. *Am J Clin Nutr.* 87(6): 1852–1859. DOI: <https://doi.org/10.1093/ajcn/87.6.1852>
- Semba RD, Pee S, Sun K, Sari M, Akhter N, Bloem MW (2008). Effect of parental formal education on risk of child stunting in Indonesia and Bangladesh: a cross-sectional study. *Lancet.* 371(9609): 322-8. DOI: 10.1016/S0140-6736(08)60169-5.
- Snyder L (2007). Health communication campaigns and their impact on behavior. *Journal of Nutrition and Education Behavior*, 39(2): S32-S40.
- Snyder LB (2007). Health communication campaigns and their impact on behavior. *J Nutr Educ Behav.* 39(2 Suppl): S32-40. DOI: 10.1016/j.jneb.2006.09.004.
- Torlesse H, Cronin AA, Sebayang SK, Nandy R. (2016). Determinants of stunting in Indonesian children: evidence from a cross-sectional survey indicate a prominent role for the water, sanitation and hygiene sector in stunting reduction. *BMC public health.* 16(1): 669.
- Torlesse H, Cronin AA, Sebayang SK, Nandy R (2016). Determinants of stunting in Indonesian children: evidence from a cross-sectional survey indicate a prominent role for the water, sanitation and hygiene sector in stunting reduction. *BMC Public Health.* 16:669. DOI: 10.1186/s12889-016-3339-8.
- Victora CG, de Onis M, Hallal PC, Blössner M, Shrimpton R (2010). Worldwide timing of growth faltering: revisiting implications for interventions. *Pediatrics.* 125(3): e473-80. doi: 10.1542/peds.2009-1519.
- Wakefield M, Loken B, Hornik R (2010). Use of mass media campaigns to change health behaviour. *The lancet*, 376(9748): 1261–1271. doi:10.1016/S0140-6736(10)60809-4.
- Wakefield MA, Loken B, Hornik RC (2010). Use of mass media campaigns to change health behaviour. *Lancet.* 376(9748): 1261-71. DOI: 10.1016/S0140-6736(10)60809-4.
- World Bank (2017). Prevalence of stunting, height for age (% of children under 5). Retrieved from: <https://data.worldbank.org/indicator/SH.STA.STNT.ZS>. (Accessed June 2020).
- World Health Organization (2017). Stunted Growth and Development Context, Causes and Consequences. Retrieved from: http://www.who.int/nutrition/childhood_stunting_framework_leaflet_en.pdf?ua=1 (Accessed June 2020).