Original Article

Addressing social barriers and closing the gender knowledge gap: exposure to road shows is associated with more knowledge and more positive beliefs, attitudes and social norms regarding exclusive breastfeeding in rural Zimbabwe

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Abstract

Exclusive breastfeeding (EBF) is rarely practiced despite its significant child survival benefits. A key constraint to increasing EBF rates in Zimbabwe and most of the developing world is that key decision makers (fathers/partners and other family members) are often poorly informed about EBF and do not attend antenatal clinics where health information is routinely provided. Informed by formative research, a district-wide campaign was conducted in rural Zimbabwe to encourage EBF and expressing and heat treating (EHT) breast milk as a means to maintain EBF. The campaign combined traditional strategies of education, counselling and outreach through health service delivery with a novel road show 'edutainment' intervention to reach men and other community members. A post campaign evaluation measured the association of road show exposure with 20 knowledge items and summative scores of social norms, beliefs and attitudes obtained through exploratory factor analysis. In adjusted models, road show exposure was associated with correct EBF knowledge ($\beta = 1.0$, $P = 0.001$), EHT knowledge ($\beta = 1.3$, $P < 0.001$) and greater perceived benefits of condom use during pregnancy and breastfeeding ($\beta = 0.5$, $P < 0.001$), and more positive EBF social norms ($\beta = 0.6$, $P < 0.001$), EBF beliefs and attitudes ($\beta = 1.0$, $P < 0.001$) and attitudes towards condom use during breastfeeding ($\beta = 0.6$, $P < 0.001$). Road show exposure was more strongly associated with EBF knowledge among men (P -value for gender $\times$ exposure group interaction = 0.03), suggesting that it also closed the knowledge gap between men and women. Longitudinal studies will determine whether road shows were associated with changes in EBF practices.

Keywords: exclusive breastfeeding, post-natal HIV transmission, social marketing, health education, IYCF.

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Introduction

Each year, 1.06 million child deaths (10% of all under 5-year mortality) are attributable to non-exclusive breastfeeding in the first 6 months of life (Jones *et al.* 2003). Exclusive breastfeeding (EBF) means feeding breast milk *only*, without addition of water, other liquids or solid foods. Compared with mixed breastfeeding (feeding solid or liquid foods in addi-

tion to breast milk), EBF provides substantial protection against diarrheal and pneumonia-related morbidity and mortality for all infants (Ashraf *et al.* 1991; Bhutta & Yusuf 1997; Arifeen *et al.* 2001; WHO 2001) and, for infants of HIV-positive mothers, is associated with reduced risk of breastfeeding-associated HIV transmission (Bhutta & Yusuf 1997; Iliff *et al.* 2005; Coovadia *et al.* 2007).

In most EBF promotion interventions (Bhandari *et al.* 2008; Britton *et al.* 2009), the target beneficiary is the breastfeeding mother. This makes sense: it is her behaviour that requires changing. However, in many places, mothers are not the only or even the predominant decision maker with regard to infant feeding. Social (normative) pressures often influence or impede mothers' intentions to EBF. In a formative study in Zambia (Fjeld *et al.* 2008), fathers and grandmothers, who were less knowledgeable and more negative about EBF but had considerable authority over infant feeding decisions, were an important barrier to EBF practice. Similarly, in Mexico (Perez-Escamilla *et al.* 1995), Ghana (Otoo *et al.* 2009) and Malawi (Bezner *et al.* 2008), pressure from family and friends (especially grandmothers in the latter contexts) was an important barrier to EBF. Finally, in Bangladesh, peer counsellors providing home visits to mothers achieved dramatically higher EBF rates at 5 months (70% vs. 6%, $P < 0.0001$) (Haider *et al.* 2000). However, pre-lacteal feeds (a common practice in this population) were still given to 31% of the intervention group babies mainly by family members or health staff and often against mothers' wishes.

We designed a campaign to promote EBF for all babies from birth to 6 months and implemented it in rural Zimbabwe. The campaign conveyed the benefits of EBF and promoted three behaviours known to facilitate EBF: initiate breastfeeding within the first hour of life, breastfeed frequently and express and heat treat (EHT) milk to maintain EBF when mothers must be separated from their infants for a few hours. EHT, which is not usually a part of EBF promotion, is one of the WHO-recommended infant feeding options for HIV-positive mothers (WHO

2009) because heat treating eliminates HIV activity while retaining most of the immunoglobulins and nutrients (Israel-Ballard *et al.* 2007). Because EHT also lowers bacterial growth in milk, thereby extending the 'shelf life' of expressed breast milk where refrigeration is absent (Israel-Ballard *et al.* 2006), EHT could be helpful to all mothers, regardless of HIV status, as a means to support EBF during times of separation from their infants. Expressing breast milk is promoted by the Baby-Friendly Hospital Initiative (BFHI) as, among other reasons, a method of sustaining breastfeeding during periods of separation.

In the first stage of the campaign, health workers were trained to target breastfeeding mothers with the campaign messages during clinic and outreach visits. However, based on earlier formative research (Gavin *et al.* 1999), we knew that reaching only mothers would likely be inadequate to achieve high rates of EBF. In separate focus group discussions, both men and women said that fathers have the final decision on infant feeding decisions. Informing men and other influential community members about infant feeding recommendations is difficult because they do not usually attend antenatal and post-natal visits (Shetty *et al.* 2008) and because most rural Zimbabweans live in isolated homesteads with little access to mass media (Central Statistical Office (CSO) [Zimbabwe] and Macro International Inc. 2007). Therefore, an 'edutainment' road show intervention was designed and implemented in collaboration with Population Services International/Zimbabwe, an international non-governmental organization with expertise in social marketing. Edutainment – the act of learning through a medium that educates and entertains the learner – has been

Key messages

- In many societies, mothers are not the only or even the predominant decision maker with regard to infant feeding.
- Road show interventions are an effective medium for delivering health education to hard-to-reach communities.
- Social networks are effective in disseminating health information and education to segments of the population not directly exposed to intervention.
- Community-wide health education can increase knowledge, promote positive attitudes, beliefs and social norms regarding EBF, and also close the knowledge gap between men and women.

used to influence a variety of behaviours, including HIV education (Singhal & Rogers 1999; Tufte 2008). The road show intervention is a method of delivering edutainment to hard-to-reach rural areas.

The EBF campaign comprised three components: Interpersonal Education Communication (IEC) material distribution, health system campaign intervention and road shows. In this paper, we report differences in knowledge, beliefs, attitudes and social norms regarding EBF among community members that were associated with road show exposure. Because the road shows were designed to reach men and other community members who normally do not receive information from the health systems and thereby address the key barrier of perceived social (normative) pressures, we further examine the extent to which the association between exposure to road shows and EBF knowledge, beliefs, attitudes and social norms is modified by gender.

Materials and methods

The campaign was conducted in Chirumanzu, a rural district of 75 000 people in central Zimbabwe where the primary occupation is subsistence farming.

IEC materials

Campaign messages were printed on posters, aprons, T-shirts, hats and dolls, and pamphlets describing the benefits of EBF and explaining how to EHT were published. A video promoting EHT that included a step-by-step explanation of how to EHT and feed the treated milk from a cup was locally produced and distributed. All materials were produced in English and the two primary local languages, Shona and Ndebele.

Health system campaign interventions

Using adapted training resources (WHO 2006; WHO & UNICEF 2006), 32 health workers, including district health leadership and representatives from 17 of the 20 health institutions in the district, were trained as campaign trainers. Over the subsequent 6 months, these trainers trained 144 of their

colleagues, who in turn, trained 381 community health workers and 168 community leaders, and sensitized 1630 community members (~4% of the district's adult population) on the campaign messages during community gatherings.

Road shows

An implementation guide was developed to incorporate the campaign messages into popular music, drama, games and participatory demonstrations to engage communities in discussions on benefits of EBF, to promote EHT as an important skill for all mothers, to encourage social and family support for EBF and to reinforce the importance of using condoms to prevent HIV transmission to the mother and the baby during the breastfeeding period. This road show was performed at 53 sites throughout the district including schools, shops, community centres, health centres and immunization outreach points. The sites were selected through a mapping exercise that ensured even coverage of the district. A total of 10 032 people (6328 females, 3704 males) or 24% (28% female, 20% male) of the district's adult population attended a road show.

Road show evaluation

One month after the last road show, a survey was conducted to compare knowledge, attitudes and beliefs of 462 adults (≥ 15 years) who had attended a road show (direct exposure), did not attend but heard about it from someone who did (indirect exposure) or had had no exposure to the road shows at all (no exposure). Six of the 23 wards in the district that had received the highest number of road shows were purposively selected to maximize direct road show exposure. A sample size of 468 respondents was required to detect a 10% difference in knowledge of any knowledge item communicated by the road show between those with direct compared with no exposure with 80% power and a type 1 error of 5%, allowing for a 15% non-response. The number of households to be sampled in each ward and the sampling interval were established based on probability proportionate to ward size. Individuals were selected

at the household to obtain approximately equal numbers of males and females, using the Kish Grid method (Kish 1965).

After ascertaining demographic information and campaign exposure, each respondent was asked a series of open-ended (unprompted) questions with pre-coded responses related to the five campaign messages. Correct answers to these questions resulted in 20 distinct knowledge items. Social norms, beliefs and attitudes regarding issues addressed in the road shows were measured by asking the respondents to rank their level of agreement with 17 statements about EBF, EHT and condom use on a 5-point Likert scale (Likert 1932) such that higher scores reflected increasing positive beliefs, attitudes and social norms. The questionnaire used in this study was adapted from an existing Population Services International (PSI) questionnaire used routinely for evaluating many PSI social marketing interventions. This questionnaire was pre-tested in rural Zimbabwe.

Data analysis

Baseline characteristics were compared across the three exposure groups (direct, indirect or none) using analysis of variance and chi-square tests for continuous and categorical variables, respectively. Logistic regression investigated the association of road show exposure group with the correct answer to each of the 20 knowledge items after adjusting for age, gender, marital status, parenthood, years of schooling and exposure to other (non-road show) EBF campaign interventions. Knowledge items were grouped into three groups, namely EBF knowledge, EHT knowledge and condom use knowledge, and a total score for each group was calculated. Standard scores for the total scores were computed and multiple regression analysis was used to investigate the association of road show exposure group with each of the standardized knowledge scores adjusting for other explanatory variables. The use of standardized construct scores makes it easier to compare the relative effect of road show exposure on the different constructs. Factor analysis, using principal axis factoring as the extraction method with promax rotation and the scree test to determine the number of factors to retain (Costello & Osborne

2005), was used to explore dimensions of the scaled social norms, beliefs and attitudes. The scores for all statements within each construct were summed to create a construct total score. Multiple regression analysis investigated the effect of road show exposure on standardized construct total scores, adjusting for other explanatory variables. In subgroup analysis, multiple regression models were used to assess effect modification of road show exposure by respondent gender; stratified analysis was conducted when the *P*-value associated with the interaction term was <0.10 .

Statistical analysis was done using STATA (StataCorp, 2007, Stata Statistical Software: Release 10, College Station, TX, USA: StataCorp LP).

Ethical approval

Ethical approval to conduct this study was granted by the Medical Research Council of Zimbabwe and the Research Institute of the McGill University Health Centres Research Ethics Committee. Informed consent was obtained from study participants prior to primary data collection.

Results

Sample characteristics and exposure to EBF campaign

Of the 462 survey respondents, 365 (79%) reported having seen at least one campaign IEC material or intervention (Table 1). One hundred sixty-three (35.3%), 112 (24.2%) and 187 (40.5%) reported no exposure, indirect exposure and direct exposure to the road shows, respectively. There were no significant differences in demographic characteristics between the exposure groups. Females were more likely than males to have heard about the EBF campaign at a health centre (57% vs. 34.4%, $P < 0.001$), while males tended to be more likely than females to have heard about the campaign at a road show (45.6% vs. 36.7%, $P = 0.078$). Among people who attended a road show (direct exposure), only 19.2% had been exposed to the EBF campaign through the health system, compared with 78.6% of the indirect respondents and 63.8% of the no exposure respondents ($P < 0.001$). These find-

ings demonstrate that road shows reached men and other people often missed by health system-based interventions.

Knowledge

Compared with the direct exposure group, respondents with indirect road show exposure were significantly less likely to recall the five key campaign messages, but were more likely to recall entertaining aspects of the campaign (e.g. dancing and prize-giving) (Table 2). In adjusted logistic regression models estimating the effect of road show exposure on knowledge items, direct exposure was significantly associated with correct understanding of 16 of the 20 items and indirect exposure with six of the 20 items (Table 3). For 19 of the 20 items, the point estimate of the odds of correct knowledge was highest for direct exposure group and greater than 1.0 for the indirect exposure group, indicating that understanding increased with increasing exposure in a dose-responsive relationship.

Among respondents with no road show exposure, about half knew that EBF means feeding breast milk only, that infants should begin breastfeeding within the first hour of life and should EBF to 6 months, that breast milk alone provides adequate energy for the infant and that EBF reduces illness. Thus, the community was relatively well informed about EBF prior to the road shows, probably as a result of previous health education delivered through the health system or community campaigns such as those held during World Breastfeeding Week commemorations.

Among respondents with no road show exposure, 60% had heard of expressing breast milk and 44% had heard about EHT, suggesting a surprisingly high knowledge of EHT in the community prior to the road show intervention. This is likely attributable to the inclusion of education about expression and heat treatment as part of the BFHI. Among indirect and direct exposure respondents, the comparable proportions were 85% [adjusted odds ratio (adjOR) = 2.9; 95% confidence interval (CI): 1.5–5.5]

Table 1. General characteristics of the sample according to EBF road show exposure*

Characteristic	Total (<i>n</i> = 462)	None (<i>n</i> = 163)	Indirect (<i>n</i> = 112)	Direct (<i>n</i> = 187)	<i>P</i> -value [†]
Age, years, $\bar{x} \pm \text{SD}$	32.8 $\pm$ 9.4	32.3 $\pm$ 9.8	34.1 $\pm$ 9.4	32.3 $\pm$ 9.2	0.24
Female	234 (50.7)	84 (51.5)	55 (49.1)	95 (50.8)	0.92
Married or cohabitating	332 (71.9)	114 (69.9)	80 (71.4)	138 (73.8)	0.72
Schooling, years, $\bar{x} \pm \text{SD}$	9.3 $\pm$ 2.5	9.0 $\pm$ 2.8	9.4 $\pm$ 2.5	9.4 $\pm$ 2.3	0.35
Ever had children	370 (80.0)	127 (77.8)	91 (81.2)	155 (81.3)	0.67
Exposed to part of EBF campaign other than road show	228 (49.4)	104 (63.8)	88 (78.6)	36 (19.2)	<0.001

EBF, exclusive breastfeeding; SD, standard deviation. *Values are *n* (%) except where otherwise noted. [†]Based on χ^2 or analysis of variance test among the three groups.

Table 2. Association between road show exposure and recall of EBF road show messages*

Message or activity	Exposure		<i>P</i> -value [†]
	Indirect (<i>n</i> = 112)	Direct (<i>n</i> = 187)	
Message 1: Breast milk only, from birth to 6 months	36.3	81.8	<0.001
Message 2: Start breastfeeding within the first hour of life	2.7	15.5	<0.001
Message 3: Breastfeed often: at least 10 times per day and on demand.	4.4	20.9	<0.001
Message 4: Expressing and heat treating breast milk supports EBF	13.3	52.4	<0.001
Message 5: Make breastfeeding safer: use condoms during sex while breastfeeding	4.4	27.8	<0.001
Dancing	23.9	17.1	0.150
Prize-giving	21.2	12.3	0.040

EBF, exclusive breastfeeding. *Values are % participants. [†]Based on χ^2 test.

Table 3. Association between road show exposure and correct comprehension of campaign knowledge items

Knowledge item	No exposure <i>n</i> = 163 (% correct)	Adjusted odds ratios (95% CI) associated with road show exposure relative to no exposure*	
		Indirect	Direct
EBF definition and benefits			
EBF means feeding breast milk only	47.9	2.6 (1.5–4.6)	15.1 (7.7–29.6)
EBF means feeding no water, no juice, nothing but breast milk	31.3	3.2 (1.9–5.6)	14.6 (7.6–27.8)
Babies should be EBF from birth to 6 months	42.3	1.9 (1.1–3.2)	9.0 (4.9–16.4)
EBF reduces illness	58.9	1.3 (0.8–2.2)	3.5 (2.0–6.1)
EBF provides enough energy for growth	54.0	1.3 (0.8–2.1)	2.4 (1.4–4.0)
EBF provides enough fluid	5.5	1.9 (0.7–4.7)	2.9 (1.2–7.4)
EBF reduces risk of MTCT	9.8	3.2 (1.6–6.5)	4.6 (2.2–9.5)
Breastfeeding initiation			
Infants should initiate breastfeeding in the first hour of life	51.3	1.0 (0.6–1.8)	1.5 (0.9–2.5)
Breastfeeding frequency			
Mothers should breastfeed at least 10 times per day	9.8	1.2 (0.5–2.6)	1.9 (0.9–3.9)
Mothers should breastfeed on demand	44.2	1.2 (0.7–2.0)	1.8 (1.1–3.0)
EHT breast milk³			
I have heard about EHT breast milk	56.4	2.9 (1.7–5.0)	26.2 (12.0–57.2)
EHT milk can be stored safely at room temperature for up to 8h	7.4	2.3 (1.0–5.2)	16.6 (7.8–35.6)
EHT helps to cup feed infant when mother is away	31.3	2.1 (1.2–3.5)	13.3 (7.2–24.5)
EHT helps mother produce plenty of milk by emptying breasts	2.4	2.4 (0.7–8.6)	5.2 (1.5–18.0)
EHT makes expressed breast milk last longer	33.1	1.4 (0.8–2.3)	2.5 (1.5–4.1)
EHT makes expressed breast milk of HIV-positive mothers safer	14.1	1.7 (0.9–3.4)	3.5 (1.9–6.5)
Condoms use by breastfeeding mothers			
Using condoms prevents re-infection of HIV-positive mothers	26.4	1.3 (0.7–2.2)	4.0 (2.3–6.8)
Using condoms prevents infection of HIV-negative mothers	18.4	1.1 (0.6–2.0)	3.1 (1.7–5.6)
Using condoms prevents pregnancy	64.4	1.6 (0.9–2.8)	0.7 (0.4–1.2)
Using condoms prevents STIs	41.7	1.1 (0.7–1.8)	1.2 (0.7–2.0)

EBF, exclusive breastfeeding; EHT, express and heat treat. *Covariates comprised: age, gender, years of schooling, marital status, ever had children, and exposed to another EBF campaign component.

and 72% (adjOR = 2.9; 95% CI: 1.7–5.0) and 96% (adjOR = 31.7; 95% CI: 11.5–87.4) and 93% (adjOR = 26.2; 95% CI: 12.0–57.2), respectively, demonstrating that the road show was effective in increasing this knowledge coverage further. Indeed, 103 (22%) of all respondents reported knowing someone who had tried EHT. Of the no, indirect and direct respondents, 63% (OR = 1.0), 79% (adjOR = 2.1; 95% CI: 1.2–3.8) and 84% (adjOR = 3.5, 95% CI: 1.9–6.3), respectively, believed that EBF for the first 6 months would be an acceptable infant feeding practice in their families.

When asked to list the benefits of EBF, 79%, 67% and 59% of respondents with direct, indirect and no road show exposure, respectively, said that it reduces infant illness, while 28%, 25%, and 10%, said that it reduces HIV transmission. And when asked to list the benefits of EHT, 80%, 52% and 32% of those with direct, indirect and no exposure, respectively, said that it provides milk while the mother was away, 49%, 40% and 33% said that it prolongs the shelf life of the expressed milk, while 35%, 21% and 14% said that it

reduces HIV transmission. These results suggest that road shows normalized EBF and EHT, disassociating these behaviours from HIV.

Beliefs, attitudes and social norms

Exploratory factor analysis of respondent agreement with 17 statements regarding EBF, EHT and condom use yielded three constructs (Table 4): (1) EBF beliefs (seven related statements, Cronbach's alpha = 0.84); (2) Condom use attitudes (six related statements, Cronbach's alpha = 0.81); and (3) Social norms of EBF and EHT (four related statements, Cronbach's alpha = 0.74).

Using multiple regression (Table 5), both direct and indirect exposures were associated with significantly more positive beliefs and attitudes towards EBF and with more positive social norms of both EBF and EHT compared with no exposure. Overall knowledge of EBF, EHT and condom use also showed the same trend. Significant differences in attitudes towards condom use and condom use knowledge were only

Table 4. Exploratory factor analysis of EBF, EHT and condom use attitude, belief and social norms scales*

Beliefs, attitudes and social norms	Factor loadings		
	Factor 1	Factor 2	Factor 3
Factor 1: EBF beliefs and attitudes Cronbach's alpha = 0.835; Eigenvalue = 5.3			
A baby cannot survive on breast milk alone for the first 6 months (R)	0.556	−0.004	−0.069
When I see a baby breastfeeding often, I think it is hungry and should be fed other foods (R)	0.616	0.054	0.064
A mother cannot produce enough milk to provide for her baby in the first 6 months (R)	0.464	0.132	0.098
It's OK for a baby to have a few sips of water here and there, in the first 6 months (R)	0.696	−0.052	0.053
Giving cooking oil can be helpful in the first 6 months (R)	0.624	0.029	0.041
Giving other foods in the first 6 months will make a baby grow up to be strong (R)	0.752	0.026	0.069
Giving breast milk alone to an infant for the first 6 months is cruel (R)	0.428	0.138	0.201
Factor 2 Condom use attitudes Cronbach's alpha = 0.810; Eigenvalue = 1.6			
Condoms are only for promiscuous people (R)	−0.022	0.753	−0.041
Asking a partner to use a condom shows you don't trust him/her (R)	0.108	0.651	−0.055
Condoms are only for use with casual partners (R)	0.037	0.620	0.002
If a partner refuses to use condoms, a woman can do nothing (R)	0.057	0.442	−0.064
Condoms are only for use to protect against infections when relationships are not serious (R)	0.019	0.726	−0.025
Suggesting condom use infers you have an STI or HIV (R)	−0.027	0.707	−0.020
Factor 3 EBF Social norms Cronbach's alpha = 0.735; Eigenvalue = 0.9			
In my family, EBF for the first 6 months is achievable	0.098	−0.064	0.857
In my family, EBF for the first 6 months is acceptable	0.086	−0.064	0.886
In my family, EHT breast milk is acceptable	−0.089	0.112	0.459
For me, using condoms for sex during the breastfeeding period is acceptable	−0.191	0.116	0.414

EBF, exclusive breastfeeding. *Extraction Method: Principal Axis Factoring; Rotation Method: Oblique promax. (R) indicates that the item was reverse coded.

Table 5. Association between road show exposure and summative factor scores of EBF, EHT and condom use beliefs, attitudes and social norms*

Construct (no. of items)	Regression coefficients associated with road show exposure relative to no exposure			
	Indirect (<i>n</i> = 112)		Direct (<i>n</i> = 187)	
	β (95% CI)	<i>P</i> -value	β (95% CI)	<i>P</i> -value
EBF knowledge (10)	0.3 (0.1–0.6)	0.002	1.0 (0.8–1.2)	<0.001
EHT knowledge (6)	0.4 (0.2–0.6)	<0.001	1.3 (1.1–1.5)	<0.001
Condom use knowledge (4)	0.2 (–0.1–0.4)	0.206	0.5 (0.2–0.7)	<0.001
EBF social norms (4)	0.5 (0.2–0.7)	<0.001	0.6 (0.4–0.9)	<0.001
EBF beliefs and attitudes (7)	0.4 (0.2–0.7)	<0.001	1.0 (0.7–1.2)	<0.001
Condom use attitudes (6)	0.2 (–0.1–0.4)	0.164	0.6 (0.3–0.8)	<0.001

EBF, exclusive breastfeeding. *Covariates comprised: age, gender; years of schooling, marital status, ever had children, and exposed to another EBF campaign component.

Fig. 1. Summative scores of EBF knowledge among women and men who were not exposed (non), indirectly exposed (indirect) or directly exposed (direct) to road shows. Bars represent means $\pm$ standard error. Asterisks indicate that means differed: ** $P < 0.01$. EBF, exclusive breastfeeding.

observed for the direct compared with the no exposure group.

Closing the gender knowledge gap

There was evidence of effect modification of road show exposure by gender (Fig. 1), with road show exposure being more strongly associated with EBF knowledge among men: men had lower knowledge than women among the no exposure group, but knowledge was similar for men and women among the direct exposure group (P -value for gender $\times$ exposure group interaction = 0.03). In addition to increasing overall knowledge of EBF among men and women (main effect), these findings suggest that exposure to road shows also closed the knowledge

gap between men and women. No significant interaction was observed for EBF beliefs and social norms.

Discussion

In this study, exposure to edutainment road shows was associated with more knowledge and positive beliefs, attitudes and social norms about EBF and EHT. Furthermore, direct exposure to road shows closed the gap in EBF knowledge between genders – with greater knowledge gain being observed among men who may influence mothers' EBF behaviour. While our study was not a test of the theory of planned behaviour, our findings can be related to it (Ajzen 1991). Whether a mother practices, or intends to practice, EBF is not only driven by her knowledge of its benefits and the risks of not EBF, but of favourable attitudes and subjective norms (perceived social pressure) and greater behavioural control (perceived ease or difficulty of EBF). In a review of studies based on the theory of planned behaviour, attitudes towards various health-related behaviours and social norms were found to be significant contributors towards the prediction of intentions, with an average correlation of 0.46 and 0.34, respectively (Godin & Kok 1996; Sutton 1998). In turn, intention was highly correlated with behaviour (0.46). Involving men and other community members is particularly important in developing countries where young mothers often lack autonomy and decision-making power – i.e. they have less behavioural control.

We could find three examples in the literature of EBF promotion interventions that pursued influential community members in addition to breastfeeding mothers. In a trial employing lay counsellor home visits to mothers in Mexico (Morrow *et al.* 1999) in which high EBF rates were also achieved (>50% at 3 months), key family members who might support mothers were included in the counselling sessions. As part of a study in Zambia in which high EBF rates were achieved among HIV-positive women (84% at 4 months post-partum), messages about EBF were included in drama presentations and talks were given to the community (Kuhn *et al.* 2007). Finally, the LINKAGES Project implemented a community-based model of behaviour change to promote EBF in Bolivia and Madagascar targeting mothers, infant caretakers and health workers (Baker *et al.* 2006). While not specifically targeting fathers and other influential family members, the strategy included theatre, fairs and mass media, which would be expected to reach the entire community.

We observed a dose-response relationship among the groups that were indirectly and directly exposed to road shows, relative to the unexposed. This finding is consistent with the diffusion theory of innovations through a community or group over a period of time (Rogers 1962): road shows may have planted the messages, but social networks reinforced them and caused them to penetrate more widely. In sparsely populated rural areas where it is not logistically feasible or costly to reach most of the population – the 53 road shows were able to directly reach only 24% of the district population – this finding is significant. While the number of road shows may be driven by resource and logistical considerations, ensuring even geographical coverage and integrating messages into other channels of health communication can optimize the actual reach of the information.

In Zimbabwe, where HIV prevalence among antenatal women is 16.1% (Ministry of Health & Child Welfare 2009), breastfeeding is nearly universally practiced, but on average, most infants are EBF for less than a month (Central Statistical Office (CSO) [Zimbabwe] and Macro International Inc. 2007). Paradoxically, emphasizing the role of EBF in reducing HIV transmission within the Zimbabwean

National Prevention of Mother to Child HIV Transmission program resulted in a perception among some people that women practicing EBF must be HIV-positive. Our results suggest that the road shows normalized EBF and EHT, and can therefore be used to disassociate these behaviours from HIV. In a study conducted in the same district following the EBF Campaign, in which we confirmed the feasibility of feeding EHT breast milk to HIV-exposed infants, the study mothers reported that they did not experience stigma when practicing EHT and attributed this to the raised awareness resulting from the campaign (Mbuya *et al.* 2010). To our knowledge, our road shows are the first large-scale intervention to promote EHT for all mothers as a means to prolong the shelf life of expressed milk to feed to infants when mothers must be away from their infants for several hours.

In this context, the road show approach was adopted to address a specific barrier identified through formative research – the gender knowledge gap. We addressed other common constraints and barriers through the content of the information (e.g. feasibility to express milk for working mothers), the demonstrations and overall edutainment (proper positioning and attachment of breastfeeding, difficulties encountered by mothers due to inadequate milk flow) and integration of campaign messages into the health delivery system (counselling and demonstration by health workers, continuous contact and support by health workers to solve queries). Three essential components should therefore be considered in replicating this intervention in similar settings: (1) utilizing formative research to identify context-specific constraints and barriers as well as possible motivators of EBF in order to inform overall program design; (2) a geographic mapping exercise to ensure even coverage relative to resources; and (3) integration of EBF campaign messages into routine health service delivery.

Two limitations of this evaluation deserve mention. First, with the observational design employed, we could not establish a cause-effect relationship between road show exposure and knowledge, beliefs and attitudes, but the dose-responsive relationship observed between these outcomes with greater exposure to the road show makes a causal relationship

plausible. Second, we did not measure EBF practices to determine if the improved knowledge, beliefs and attitudes led to higher EBF rates. In addition to shifting beliefs, attitudes and social norms, future studies should also evaluate EBF behaviour change by comparing pre- and post-campaign practices.

Exposure to road shows was associated with more knowledge and positive beliefs, attitudes and social norms surrounding EBF and positive attitudes about condoms. For Zimbabwean infants, and perhaps for the majority of infants in the world, it is likely that universal EBF from birth to 6 months will be achieved only if mothers receive support to do so from their husbands/partners, own mothers, mothers-in-law and other influential community members. The 'edutainment' road show is a novel strategy for reaching these critical decision makers.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Contributions

ALJ, NVT and RCM designed the evaluation; ALJ, NVT, KC, NT and RCM conducted the evaluation; BC, WM and MNNM performed statistical analysis; ALJ and MNNM wrote the paper; ALJ has final responsibility for final content. All authors read and approved the final manuscript.

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