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Original article

Comparing video and poster based education for improving 6-17 months children feeding practices: a cluster randomized trial in rural Benin

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Summary. *Objective:* This study aimed to assess whether short nutrition educational videos were more effective to improve child feeding practices compared to posters in a highly food insecure rural area in Southern Benin. *Materials and Methods:* A two-arm cluster-randomized trial was implemented in two districts of the Mono region, Benin. Over a 6 months period, eight villages received nutrition education sessions using either short videos (n=4 villages) or posters and flyers (n=4 villages). Dietary practices were collected among 6-17 months children (n=155) before and at the end of the nutrition education program using a qualitative 24 hours recall. UNICEF/WHO indicators for dietary diversification and meal frequency assessing were derived for each child. The videos versus posters effect was assessed by the difference-in-differences (DID) estimator using generalized estimated equations (GEE). *Results:* Overall, respectively 49% and 72% of children had achieved Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF) at baseline. Results from DID analysis showed that videos did not have significant advantage in terms of improving children feeding practices compared to posters neither for dietary diversity (DID = -0,036; p-value=0,651) nor for meal frequency (DID = -0,048; p-value=0,574). However, others factors namely children age, mother age and districts, had significant influence on these feeding practices. *Conclusions:* The nutrition education program using posters and videos performed the same in improving complementary feeding practices. The conditions of the utilisation of videos might be improved and other factors determining children feeding practices taken into account to allow mothers and other participants to benefit from nutrition sessions.

Key words: nutrition education, communication, complementary feeding practices, dietary diversity, meal frequency, 6-23 months children.

Abbreviations

DDS: Dietary Diversity Score
DHS: Demographic Health Survey
DID: Difference-in-Differences
GEE: Generalized Estimating Equations
MDD: Minimum Dietary Diversity
MMF: Minimum Meal Frequency
NGO: Non-Governmental Organization
UNICEF: United Nations International Children's Emergency Fund
WHO: World Health Organization

Introduction

Poor child feeding practices are an issue globally. According to a review of Demographic Health Surveys (DHS) from 60 countries, only 36% of children aged 6 to 23 months achieved the minimum dietary diversity (MDD). Only 22% of children achieved MDD and minimum meal frequency (MMF) (1). In Benin, complementary feeding practices are sub-optimal. In 2014, children who reached MDD, MMF and Minimum Acceptable Diet were respectively 26%, 45% and 16% (2). There is a large burden of malnutrition, 32% of children under five are stunted, with 12% severely stunted (2). Stunting prevalence increases significantly during the period of 6-23 months indicating that poor complementary feeding practices contribute to the high burden of malnutrition among children in Benin (2-4). At the same time, a large diversity of cultivated and wild foods are locally available and accessible (5,6).

To better understand this contradictory situation, Bioversity International investigated the current and potential role of local foods in meeting nutritional requirements from complementary foods in a highly food insecure area, the department of Mono in Benin. The research was implemented in the two districts with highest percentages of households affected by food insecurity, namely *Bopa* (40%) and *Houéyogbé* (34%). Cross-sectional dietary intake studies showed that complementary feeding practices were not optimal. Only 49% and 39% of children between 6 and 11 months in *Bopa* and *Houéyogbé*, respectively, achieved MDD. Consumption of nutritious foods such as eggs (2.1%) and milk (2.7%) was very low (7,8).

According to the national DHS, the proportion of stunted children decreases significantly from illiterate mothers to instructed ones (2,3,4). This positive relationship between mother instruction and child nutritional status was confirmed by several studies in low and middle income countries in Africa (9-12). Furthermore, even if formal instruction is important, mother's knowledge on children feeding practices and nutrition has been shown to be more crucial in certain situations (13). Several studies in different countries found that nutrition education used alone or combined with others strategies could contribute to better feeding practices and/or improved nutritional status (14-23).

In spite of large diversity of cultivated and non-cultivated foods being locally available and accessible in the study areas, as stated previously, complementary feeding practices and children nutritional status were still inadequate. This highlights the importance of educational pursuits in the areas.

An intervention study providing nutrition education was carried out, whereby we capitalized on the WHO and UNICEF guidelines (24,25) as well as knowledge on locally available agrobiodiversity, to develop the educational materials. During a diagnostic project phase, the current and potential role of local foods in meeting nutritional requirements from complementary foods in the districts of *Bopa* and *Houéyogbé* in Mono department, a highly food insecure area, was investigated. Subsequently, key nutrition education messages were developed in accordance with WHO and UNICEF guidelines (24,25). Recommendations were adapted to the local context, for example, foods from local biodiversity were suggested to improve complementary feeding practices.

The education program was organized as a combination of principles from two theories used to promote health behavioural changes: the Health Belief Model and the Social Ecological Theory. It aimed to capitalize on the advantages of videos especially in rural and low literacy context (26-28). Communication tools were designed to influence mothers' perceptions and practices regarding complementary feeding. Allowing every household or community member, furthermore, to participate in the education sessions and encouraging all to share their experiences and worries made it potentially easier for mothers to adopt healthy behaviours through the creation of an environment conducive to change (29).

In Benin, similarly to many low income countries, visual aids such as posters, flyers or image boxes have been traditionally and largely used, while the use of videos are relatively new in education program (28,30). However, videos present many advantages in terms of standardization of message, facilitation of understanding and remembrance etc (26-28,31). Results from a study in Benin showed that videos were more attractive and facilitated memory compared to other communications tools (28). According to the Benin National Council of Nutrition (30), videos represent the best education tools for nutri-

tion program at communities, households and schools levels followed by others audio and visual supports. The objective of the present study was to assess whether short educational videos used in nutrition education programs were more effective to improve child feeding practices compared to traditional ways of nutrition education using posters and flyers with same messages in rural villages in Southern-Benin.

Materials and Methods

Settings

The study was part of a research project implemented in the districts of *Bopa* and *Houéyogbé* in Southern-Benin. The area is predominantly rural, food insecure, with low literacy levels, particularly for women. The research project included food consumption, household food security, ethnobiology and market surveys, as well as nutritional status assessments in a first phase. This paper presents the results of the subsequent nutrition education intervention conducted in the same area.

Design and sampling

Seventeen villages participated in the nutritional diagnostic survey (7,8) and then received the nutrition education program. In each district, villages were paired considering their socioeconomic and demographic characteristics; child feeding practices and nutritional status. For each pair (two villages with similar characteristics), videos were attributed to one village and posters and flyers to the other. Distance between villages was also considered. Neighbouring villages received the same intervention (poster-flyer or video) in order to avoid contamination. Distance between villages with different education tools was about 8km in *Bopa* and 5km in *Houéyogbé*.

The evaluation of the program was done with a sample of height villages randomly selected among the seventeen villages using casting lot technique: four in *Bopa* (*Hounviatouin*, *Tèkozouin*, *Djidjozoun* and *Kpavé*) and four in *Houéyogbé* (*Gbadagli*, *Dahè-Kpodji*, *Zoungbonou* and *Aguêhon*) districts. The design was a cluster-randomized trial with two intervention arms (video messages and poster-flyer messages). In each District, two villages receiving video messages and two receiving poster-flyer messages were selected.

Eventual contamination was assessed through asking the participants whether they heard about or participated in the education program in another village; no positive case was reported.

This study is a part of a nutrition education program aiming to improve not only complementary feeding but also breastfeeding practices and children health care. Therefore the overall target group is children aged 0-23 months. At baseline (prior to the nutrition programme), we considered children aged 0-17 months aiming to have the same children aged 6-23 months at endline (at the end of the nutrition programme, six months later). Within each village, all mothers with a child aged 0-17 months were listed. From this list, 45 mother-child pairs were randomly selected using casting lots technique and surveyed. In total (for the eight villages), 360 pairs were interviewed at baseline. Due to some technical constraints, the nutrition programme started not just after the baseline but two months later. Therefore, from the baseline sample, 257 mother-child pairs (136 in poster-flyer group and 121 in video group) were interviewed at endline, 103 mother-child pairs (29%) had to be replaced because of non-availability of informants or because of children having outgrown the target age bracket (>23 months). Since education sessions were organised for the whole cluster/village, i.e. all community members were invited no matter whether they participated in the baseline survey or not, the number of replacement mother-child pairs had been sampled randomly from the updated lists of mothers with child between 6 and 23 months for each village. However, only mothers with children aged 6-17months and who participated both baseline and endline surveys (n=155) have been considered for analysis in the present paper. We focused on this age group since, majority of children continued to benefit from breastfeeding and receive also complementary foods during this period according to national DHS (2). Analysis among the whole sample (including replacement cases) had also been performed but showed similar trend.

Ethical considerations

The research protocol covering the whole study was approved by the Benin National Ethics Commit-

tee for Health Research (N°45/MS/DC/SGM/DFR/CNERS/SA). Written informed consent was also obtained from all participants before collecting data.

Production of educational tools

Results from the diagnostic surveys described previously (7,8) revealed gaps in nutrition knowledge and practices from which we derived the main education topics: 1) Mothers' diet during pregnancy and breastfeeding practices, 2) Complementary feeding practices, 3) Strategies to improve the nutritional value of complementary foods of children, 4) Hygiene and Diarrhoea, Prevention of micronutrient deficiencies and supplementation, 5) Stunting - Support and prevention of malnutrition. For each topic, key messages were derived in accordance with the WHO and UNICEF nutritional guidelines (24,25).

GloCal Videos from an existing nutrition education program, implemented in Eastern Africa (www.glocalnutrition.com), which correspond to our key messages for Benin, were selected. Transcripts and pictures from the GloCal videos were adapted to the local context (e.g. foods not available in our study area were replaced). However, there was no Glocal video for key message relative to stunting. More, key messages relative to complementary feeding practices and the need of good protein sources for infants and children were not adequately covered by Glocal videos. For these three key messages, three new videos were produced by the research team and used during education sessions. For the new video among the need of proteins, the scenario was written and a sketch was realized in a local school using teacher and pupils. The video relative to Stunting was an animated cartoon for which we wrote the text and a professional designer drew pictures. The video relative to complementary feeding practices was a real life situation filmed in one of the study villages.

All videos used during education sessions, basically in English or French, have been translated in the three most spoken local languages of the study area, namely: *Fon*, *Sahouè* and *Kotafon*. The research team made sure that messages in the videos were preserved when translating. Table 1 presents the list of videos.

Posters, the comparative method to the videos, were produced in line with the WHO and UNICEF nutrition guidelines using pictures (24,25,32). First,

Table 1. List of videos used during nutrition education sessions

Topics	Videos topics	Sources
Topic 1: Mothers' diet during pregnancy and breastfeeding practices, Part 1	Additional needs during pregnancy and breastfeeding	Adapted from Glocal
	Colostrum	Glocal
	Exclusive breastfeeding	Glocal
Topic 1: Mothers' diet during pregnancy and breastfeeding practices, Part 2	Advantages of breastfeeding	Glocal
	Sufficiency of breastfeeding	Glocal
	Breastfeeding problems	Glocal
	Mothers breast milk versus cow milk	Glocal
Topic 2: Complementary feeding practices	Why starting complementary feeding at 6 months?	Adapted from Glocal
	Dietary diversity	Adapted from Glocal
	Complementary feeding practices	New video
Topic 3: Strategies to improve the nutritional value of complementary foods of children	Recipes to improve complementary foods nutritional value	Adapted from Glocal
	Infants and children need good protein sources	New video
Topic 4: Hygiene and Diarrhoea, Prevention of micronutrient deficiencies and supplementation	Hygiene	Glocal
	Worms	Glocal
	Anaemia	Adapted from Glocal
	Sources of iron	Adapted from Glocal
	Folate	Adapted from Glocal
	Vitamin A	Adapted from Glocal
	Malaria	Glocal
Topic 5: Stunting and Support and prevention of malnutrition	Stunting	New video

pictures used in nutritional education programs in Benin and other countries were reviewed and used when matching with the key messages. Where necessary, new pictures were designed; the key message was presented to a professional designer and discussed. The newly produced picture drafts were corrected and validated by nutrition experts before finalisation.

Posters were designed around the same key messages as the videos. Based on the posters, we made small flyers summarizing the information to distribute to the mothers after poster sessions only. Posters were mainly based on pictures and small messages in French. However, discussions were made in local languages.

Organization of nutritional education meetings

Sessions were organized in a public area using local language twice a month per village. All community members (not only mothers) were invited to attend. A nutritionist/moderator presented the poster or video and subsequently invited the participants to ask questions and share their experiences and worries regarding the topic.

Poster sessions were organized during the day in a hall or under a tree or in a hut. The different pictures on the posters were discussed. Video sessions were organized outdoors by night (starting between 7.30 and 8 pm). Videos were projected on a white screen and a loud speaker was used. During each session, each video was presented at least twice. Subsequently, the video content was discussed part by part. Then, we moved for the next video. No flyer was given.

Each session lasted between one to two hours depending on the duration of discussions.

Nutrition programme lasted six months. We grouped posters and videos around the five main topics described above (Table 1). Topic 1 was developed during two sessions since it encompassed many videos. Each of other topics (2, 3, 4 and 5) were developed during one education session. In each village, two education sessions were organized per month. Therefore, the first round of the six sessions (Topic 1 part 1, Topic 1 part 2, Topic 2, Topic 3, Topic 4 and Topic 5) lasted three months. Then, we organised a second round (revision round) of all sessions. This means that each education topic had been developed twice in a village over the period of intervention, once during each round of sessions.

Sessions were organized at community level meaning that all community members (not only mothers) were invited to attend.

Data collection

Mothers or primary caregivers were interviewed. Data collected were: (1) mothers' socio-economic characteristics (activities, matrimonial status, instruction level etc.) and (2) child aged 6-17 months feeding practices and food consumption data using a 24 hours recall. For each child, all foods/recipes (including drinks) consumed the previous day were listed. Then, for each recipe, all the ingredients were recorded.

Data analysis and statistics

From the 24 hours recall data, foods consumed by the children were split into ingredients and categorized into seven food groups. Meal Frequency (MF), Dietary Diversity Score (DDS), Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF) indicators were estimated following WHO and UNICEF guidelines (24,25,33). Feeding practices and socio-economic characteristics were compared (poster-flyer vs video groups) at baseline using univariate statistical tests, Pearson's chi square (34). Student t-tests or Mann Whitney test were used for continuous variables.

Univariate chi-square tests were used to examine whether the proportion of children that achieved each of the indicators differed between the poster and video group at baseline.

Results from the above univariate chi-square tests may be biased due to confounding effects related to care-givers' characteristics (age, ethnicity, instruction level, matrimonial status, number of nutrition training sessions attended, number of income generating activities), having participated in nutrition education in the past, child age and sex, as well as District (*Houéyogbé/ Bopa*). To account from this, the intervention effect (video -coded 1 and considered as intervention group- compared to poster-flyer -considered as reference group, coded 0-) from thebaseline to endline surveys was assessed by the difference-in-differences (DID) estimator using DDS and MF rather than

MDD and MMF since continuous variables usually allow strongest analysis than derived categorised variables. However analysis were also performed for MDD and MMF. These results, not presented in this paper, showed similar trend.

The DID is an impact evaluation approach applicable whenever one has access to panel data and/or repeated cross-sectional data. DID estimator removes unobserved fixed effects via within-person comparisons over time as well as common period and ageing effects by comparing the trends of an intervention and reference group. The between-comparison with the trend of a reference group additionally removes any common period effects that affect the intervention and reference group in identical ways as well as any ageing effects (35).

To account also from data structure (panel data), the DID analysis was run under a generalized estimating equations (GEE) framework (36,37,38) similarly as in Waswa et al (23). We used Poisson loglinear distribution considering the type of dependent variables. Data were analysis following Intention To Treat approach.

To allow comparison between baseline and endline, data used in this paper were related to complementary feeding among children aged 6 to 17 months, which is the age group common to the two surveys. Further analysis had been performed among all children aged 6-23 months and results (not presented) showed similar trend.

All statistical analyses were implemented in SPSS version 23.

Results

Socio-economic characteristics of informants

Most of socioeconomic characteristics relative to mothers and children were similar in the two groups (Table 2). Even if majority of mothers (84,5%) were from *Sahouè* ethnic group, significant differences were observed between groups, the percentage of *Sahouè* in Poster group is higher than video group. Mothers in video group were involving in more income generating activities than poster-flyer group.

Globally, about half of mothers participated the nutrition sessions organised. Participation to nutrition

Table 2. Socioeconomic characteristics of children and mothers and participation to nutrition education programme.

Characteristics	Total (n=155)	Poster (n=83)	Video (n=72)	p-value
Children				
Age of children	10.0 ± 2.6	9.9 ± 2.7	10.1 ± 2.4	0.573[S]
Children sex				
Boys	53.5	55.4	51.4	0.616[C]
Girls	46.5	44.6	48.6	
Mothers				
Age of mothers	28.2 ± 6.1	27.6 ± 6.1	28.9 ± 5.9	0.161[S]
Matrimonial status of primary caregiver				
Living alone	18.1	18.1	18.1	0.998[C]
Living with husband	81.9	81.9	81.9	
Instruction recoded				
Illiterate	69.0	69.9	68.1	0.892[C]
Literate or Primary school	20.6	19.3	22.2	
Secondary school and more	10.3	10.8	9.7	
Ethnic group				
Sahoué	84.5	95.2	72.2	<0.001[C]
Autre	15.5	4.8	27.8	
Income Generating Activities	91.0	84.3	98.6	0.002[C]
Number of Income Generating Activities	1.5 ± 0.9	1.4 ± 1.0	1.7 ± 0.9	0.040[M]
Nutrition education				
Participation to a nutrition education programme in the past	3.9	2.4	5.6	0.311[C]
Participation to at least one nutrition session	53.5	54.2	52.8	0.858[C]
Participation to all nutrition sessions	13.5	12.0	15.3	0.558[C]
Number of nutrition sessions attended	1.5 ± 1.8	1.5 ± 1.8	1.7 ± 1.9	0.735[M]

Statistical tests: C, Chi square; S, Student t test; M, Mann Whitney.

**Values presented are percentages or Mean ± Standard deviation. Explanations among Matrimonial status of care givers: 'Living with husband' corresponds to woman married who lives with her husband and 'Living alone' to woman who is married but doesn't live with her husband, divorced or widow.*

education programme even if in the past did not differ from one group to another.

Description of feeding practices at baseline

Cereals, roots and tubers were the most important food group and were consumed by almost all children (Table 3). Food groups consumed by more than 50% of children were: flesh foods, vitamin A products (including leafy vegetables, red palm oil etc.) and others fruits and vegetables. Eggs and milk products were less consumed (< 5% of children).

Percentages of children who consumed legumes and nuts in one hand and fruits and vegetables different from those rich in vitamin A differed from poster-flyer to video group (p=0.005 and p=0.044 respectively).

About half of children achieved the MDD in the two groups. However, DDS showed slightly significant advantage for video group. MMF percentages were about 72% with no significant difference between the two groups (Table 3).

Table 3. Complementary feeding practices among 6-17 months children at baseline

Parameters	Groups			p-value
	All (n=149)	Poster (n=77)	Video (n=72)	
Food groups				
Cereals, roots and tubers	99.3	100.0	98.6	0.299[C]
Legumes and nuts	24.2	33.8	13.9	0.005[C]
Vitamin A rich products	61.1	62.3	59.7	0.744[C]
Other fruits and vegetables	62.4	70.1	54.2	0.044[C]
Milk and milk products	0.7	1.3	0.0	0.332[C]
Eggs	4.0	2.6	5.6	0.359[C]
Fishes and meat	67.8	71.4	63.9	0.325[C]
Feeding practices indicators				
MF	2,7±1,0	2,7±1,0	2,7±1,0	0.542[M]
DDS	3.2 ± 1.4	3.4 ± 1.3	2.9 ± 1.4	0.034[M]
MDD	49.3	56.6	41.7	0.070[C]
MMF	71.6	73.7	69.4	0.567[C]

Statistical tests: C, Chi square; M, Mann Whitney.
**Values presented are percentages or Mean ± Standard deviation*

Effect of the intervention on achieving recommendations

Video was associated to a better likelihood to increase DDS. However, the DID estimates from the GEE models assessing the effect of using video compared to poster-flyer on the likelihood to increase DDS and MF (Table 4) showed no statistically significant difference. This indicates that video did not significantly decrease or increase the likelihood to have a greater DDS or MF compared to poster-flyer.

Regarding the other explanatory variables included in the DID models, none of the following variables related to care-givers (education level, number of training session attended, having or not an income generating activity and having participated in nutrition education in the past) influenced significantly the feeding practices. However, child age was significantly and positively associated to both DDS and MF indicating that the likelihood to reach a better dietary diversity and meal frequency increased with children age. Younger mothers were also less likely to increase the dietary diversity of their children than older ones whereas mothers living in *Bopa* were more likely to increase the meal frequency than those living in the district of *Houéyogbé*.

Globally, the intercepts in the two models were significant indicating that there were others variables explaining feeding practices that were not taken into account.

Discussion

Foods given to children in this study were mainly cereals, roots and tubers based corroborating with the literature on households' diets in the country (3,39-43).

Results showed that, overall, about half of children had achieved MDD at baseline and more than 60% reached MMF. Very similar values were presented by Mitchodigni et al (7,8) for the same districts. However, these trends were very different and high compared to results from DHS. Indeed, our survey was conducted during harvesting period. In general, seasons affect the availability of different foods and therefore, could influence dietary diversity (41,44). In a rural poor household context, where financial power to purchase food is low, results from two African coun-

Table 4. Results from GEE analysis among 6-17 months children dietary diversity score and meal frequency

Parameters	B	Std. Error	Hypothesis Test		
			Wald Chi-2	df	p-value
Dietary Diversity Score					
Intercept	0,595	0,1724	11,904	1	0,001
Survey: Baseline vs Endline (R)	0,051	0,0676	0,566	1	0,452
Districts: *Bopa* vs *Houéyoghé* (R)	-0,004	0,0470	0,007	1	0,934
Sex of children: Boys vs Girls (R)	-0,082	0,0421	3,785	1	0,052
Group: Poster vs Video (R)	0,167	0,0685	5,957	1	0,015
DID	**-0,036**	**0,0798**	**0,204**	**1**	**0,651**
Nutrition education past: No vs Yes (R)	0,004	0,0559	0,006	1	0,936
Matrimonial status: LA vs LWH (R)	0,080	0,0507	2,507	1	0,113
Ethnic group: *Sahouè* vs Others (R)	-0,042	0,0621	0,450	1	0,502
Age of children	0,024	0,0084	8,356	1	0,004
Number of training sessions attended	0,019	0,0139	1,967	1	0,161
Mothers instruction level	0,047	0,0343	1,889	1	0,169
Age of mothers	0,009	0,0039	5,059	1	0,024
Number of activities	-0,019	0,0237	0,667	1	0,414
Meal Frequency					
Intercept	0,938	0,1763	28,272	1	<0,001
Survey: Baseline vs Endline (R)	-0,114	0,0652	3,045	1	0,081
Districts: *Bopa* vs *Houéyoghé* (R)	-0,109	0,0475	5,222	1	0,022
Sex of children: Boys vs Girls (R)	-0,022	0,0441	0,253	1	0,615
Group: Poster vs Video (R)	0,025	0,0604	0,169	1	0,681
DID	**-0,048**	**0,0861**	**0,316**	**1**	**0,574**
Nutrition education past: No vs Yes (R)	0,021	0,0650	0,100	1	0,752
Matrimonial status: LA vs LWH (R)	-0,003	0,0601	0,002	1	0,963
Ethnic group: *Sahouè* vs Others (R)	-0,072	0,0629	1,313	1	0,252
Age of children	0,023	0,0084	7,218	1	0,007
Number of training sessions attended	0,008	0,0129	0,351	1	0,553
Mothers instruction level	0,061	0,0335	3,310	1	0,069
Age of mothers	0,002	0,0040	0,275	1	0,600
Number of activities	-0,010	0,0213	0,233	1	0,630

LA=Living Alone. Woman who is married but doesn't live with her husband, or divorced or widow. LWH=Living with husband. Woman married who lives with her husband; R=Reference category

tries, with one having similar agro ecological characteristics with Benin, showed that the harvesting period corresponds to good food availability (45,46).

Results from DID analysis showed that children in video arm and those in poster-flyer arm performed the same with dietary diversity and meal frequency. So, video did not have a significant better likelihood of increasing DDS and MF compared to poster-flyer arm.

Some studies have compared the effect of videos used in nutrition education to other communication tools. A systematic review on the effectiveness of video-based education (47) showed that interventions using video were variably effective for modifying health behaviour. Significant improvements in behavioural outcomes were not reported uniformly across all studies. The effectivity depends on the target behaviours to be influenced; video-based education is effective in influencing certain types of health behaviours and non-effective for others. Authors (47) underlined the fact that videos shall be tailored, meaning adapted to the message, the target population and the context of diffusion. Nevertheless, the majority of the studies included in this review were from developed or high income countries; results may thus not be systematically applicable to low income countries like Benin. Unfortunately, literature from developing

or African countries on this specific domain is scarce. Videos have, however, some advantages compared to other methods. They are more attractive and facilitate mobilisation, e.g. in the present study, the number of people attending the video sessions was twice as much than for the poster sessions. In 2008, an NGO showed videos to farmers in 19 villages in Benin. These videos had attracted large audiences of community members, including youth and women (28). In our study, videos featuring fellow village inhabitants as actors received more appreciation.

Videos do not necessarily need to be facilitated by an expert who knows the subject; sometimes the video can speak for itself (28). It removes inconsistencies across educators and balances the presentation of information to provide more standardized education (31). Videos are also suitable for individuals or populations with low health literacy or illiterate audiences (26,27) and they facilitate message recall. Bentley et al. (28) showed that farmers were able to remember education videos they had seen five years later. This paper, however, only analysed behaviours and did not look into changes in knowledge and attitudes.

The fact that participants in this study received individual flyers at the end of the poster sessions and not after the video sessions might have mitigated the advantage of videos. According to Glanz and Rimer (48), using multiple communications channels (here poster + flyer vs video) increases the efficacy. Flyers allowed people to set their own pace in reviewing information when back home (47). Combining videos with flyers could increase their efficacy. Another possibility would be to share videos with participants by copying them on their smartphones after the sessions. However, most rural dwellers in Benin do not own smartphones.

Another issue is that posters were presented during the day, but videos had to be presented at night to improve quality of projection. During the night, after work, people could be more available and more focus on to watch video with no stress among their activities (to go market or to farm for example). However, after a whole day of activities, mothers could have been tired and less concentrated on the content presented and discussed. People in remote villages with lack of basic services such as power or running water, could have been more attracted to the technology (electricity, big screens, projectors, etc.) than the content of the videos.

Results showed that dietary diversity and meal frequency are influenced by some other socioeconomic factors. DDS and MF increased with children age. Results from national DHS (2-4) and literature for other African countries (49-51) confirmed these trend. Indeed, when children are growing, they move from eating cereal (especially maize) porridge to extracts from family dishes which are more diversified. Mother's age was positively associated with dietary diversity. Similar results were found in Ethiopia for child dietary diversity (52). As the age increases, mothers gain experience in child feeding.

We observed also that mothers in the district of *Bopa* were more likely to increase the meal frequency than those living in *Houéyogbé*. This difference was also observed by Mithodigni et al (7) even if not significant. Mother occupation could be pointed out here. The occupation could provide or not an opportunity for mothers to be with their children while working and nurse them properly (53,54). According to our field observations, mothers in *Houéyogbé* were mostly involving in out-of-home activities. However, most of mothers in *Bopa* were involving in agriculture or home based small activities. Even if they had to go to farm, they used to move with their children and this allowed them to continue to feed them. In the same direction, Mitchodogni et al (8), found that when mothers were involving in income-generating activities, their children were less likely to meet MMF.

Limitations

Feeding practices could not be changed rapidly; therefore, there are two challenges: using a sample too small to detect the effects produced or intervention duration being too short to measure an impact (55).

The period of 6 months is usually considered and recommended as the minimum to observe outcomes from interventions targeting complementary feeding even if on growth performance (56,57). However, some complementary feeding practices, such as dietary diversity could change rapidly if interventions reach the specific constraints of the target group (58). In-

terventions implemented during 3 to 6 months and based on behaviour change approaches could lead to improved complementary feeding practices (58).

Sample size is actually a major issue in assessing effectiveness of nutrition education intervention. However, sample size varies greatly across studies, for example from only n=8 to about n=1424 mainly depending on the objectives of the study and the level of difficulty to collect the outcome data. We have: n=8 for Bauer & Capra (59); n=60 for Isenring et al. (60); n=80 for Ha & Caine-Bish (61); n=99 for McAleese & Rankin (62); n=198-207 for Waswa et al. (23) and n=1424 for Hoddinott et al. (63). While our sample size (n=360 for the whole sample, n=257 for both baseline and endline and n=155 considered in the present study) could be seen as low compared to other studies, it is higher than that of Waswa et al. (23) who did similar studies in Kenya (15 villages and n=150) and we believed it was sufficient to make accurate inference. We could have used some formulas to calculate the sample size a priori but this would have implied speculations on parameters such as variance, effect size, and we deliberately chose to not do such speculations.

Conclusion

The present study compared videos and posters-flyers used as communication tools in a nutrition education program implemented in a rural area in Southern-Benin. Results didn't show a significant advantage of videos in terms of improving child dietary diversity nor meal frequency compared to posters and flyers. More investigations are needed in order to disentangle the effects of videos and posters on mothers' nutrition knowledge and attitudes as these factors could influence feeding practices. The contribution of each video, either Glocal videos or newly designed ones, could also be considered. Furthermore, we recommend the videos being tested for use in different settings, such as health centres and for different audience such as extension workers as the conditions in rural villages in Benin (no electricity, no smartphones, etc.) are logistically challenging.

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