

## The Influence from Packaging Design Elements of Child Food on Quality Perceptions of Beninese's Consumers

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### Abstract

Child malnutrition is a major problem in Benin, where 31% of children under five are stunted and 5% are wasted. The artisanal production of affordable, tasty and nutritious baby foods by local women entrepreneurs could help alleviate the problem. However, appropriate, professional and attractive packaging is needed to minimize spoilage and access markets in urban and peri-urban areas. The aim of our study was to identify the elements that could potentially communicate positive quality attributes on the packaging of infant formula for mothers. To this end, a photovoice study was conducted in the Parakou community in northern Benin with 15 mothers of children under the age of five. The photovoice methodology describes the experiences and perceptions of participants through photographs. The results showed that thirteen photos of different elements such as nature (fruits, trees, gardens), people (babies) and utensils had a positive value for the mothers. It remains to be verified whether the representation of these elements or their derivatives on the packaging of children's foods would create interest and confidence in the acceptance of these foods by mothers. This could become a competitive advantage for local producers of infant foods in the face of competition from imported products.

**Key word:** Child food, packaging design, malnutrition, photovoice, Benin

### 1. BACKGROUND

Child malnutrition remains one of the most important public health problems of the century in many countries, especially in the developing world. In fact, more than 200 million children under the age of five are affected by various forms of malnutrition in African countries until 2020 (Unicef, 2020). In Benin, 5% and 32% of children under five are emaciated and stunted respectively (National Institute of Statistics and Economic Analysis (INSAE) & ICF, 2019). More than 60% of children under the age of five

are anemic with more than 60% of cases due to iron deficiency (World Health Organization -WHO-, 2012) - with remarkable disparities between rural and urban regions and areas.

Numerous interventions have been implemented in countries to address the evil of the century that is malnutrition. In Benin, between 1987 and 2017, 106 projects and programs with direct health and nutrition actions have been implemented (World Food Program -WFP-, 2018). Despite these interventions, nutrition indicators remain unsatisfactory. The causes are multiple and multifaceted (Unicef, 2020; Young, 2020) with the observation that there is no continuous supply of affordable nutritious food for populations that are already low-income. Given the low incomes of these populations, affordability of nutritious foods remains a serious problem and local artisanal production of nutritious foods by processors and entrepreneurs could be a relevant and effective option. Empowering and targeting women in this context is a promising avenue for improving child nutrition (Gillespie & van den Bold, 2017, Asogwa et al., 2017) because women are generally responsible for processing traditional food products (Franz *et al.*, 2014).

However, the processing of traditional food products by women remains at the artisanal stage, leaving the nutritional quality and packaging of these foods uncompetitive with imported foods (Dimaria *et al.*, 2018). There are several problems associated with packaged imported child food in Benin and West Africa more generally (Dimaria et al., 2018; Reardon et al., 2021). These problems relate to the nutritional quality. Packaged imported child food may not be tailored to the specific nutritional needs of children, and may not meet local dietary habits and preferences. This can result in inadequate nutrient intake, which can contribute to malnutrition and poor health outcomes. Also affordability is a problem. Packaged imported child food can be expensive, making it difficult for low-income families to access. This can lead to a reliance on less nutritious, cheaper alternatives, which can further exacerbate nutritional deficiencies and poor health outcomes. Further issues relate to the sustainability of imported packaged child food. These foods can create a dependency on external food sources and undermine local food systems (Vroegindewey et al., 2021). This can have negative economic and environmental impacts in the long term. Furthermore, safety and quality of packed child food can be challenging. Imported packaged child food may not be subject to the same domestic quality and safety standards as locally produced foods. In addition, there might be a lack of cultural appropriateness. Packaged imported child food may not be culturally appropriate, with unfamiliar flavors, textures, and ingredients that may not be accepted or desired by children and their families. This relates also to marketing practices. The marketing of packaged imported child food may create unrealistic expectations and promote unhealthy eating habits, leading to overconsumption of processed foods and sugary drinks. Overall, the problems associated with packaged imported child food in West Africa highlight the importance of developing locally produced and culturally appropriate foods that meet the nutritional needs of children while also promoting economic and environmental sustainability.

In a globalized trade context, the attractiveness and competitiveness of traditional nutritious foods produced by local women's groups and small-scale processors requires appropriate, professional and attractive packaging (Stobaugh *et al.*, 2017; Nepfumbada, Dzinamarira and Mashamba-Thompson,

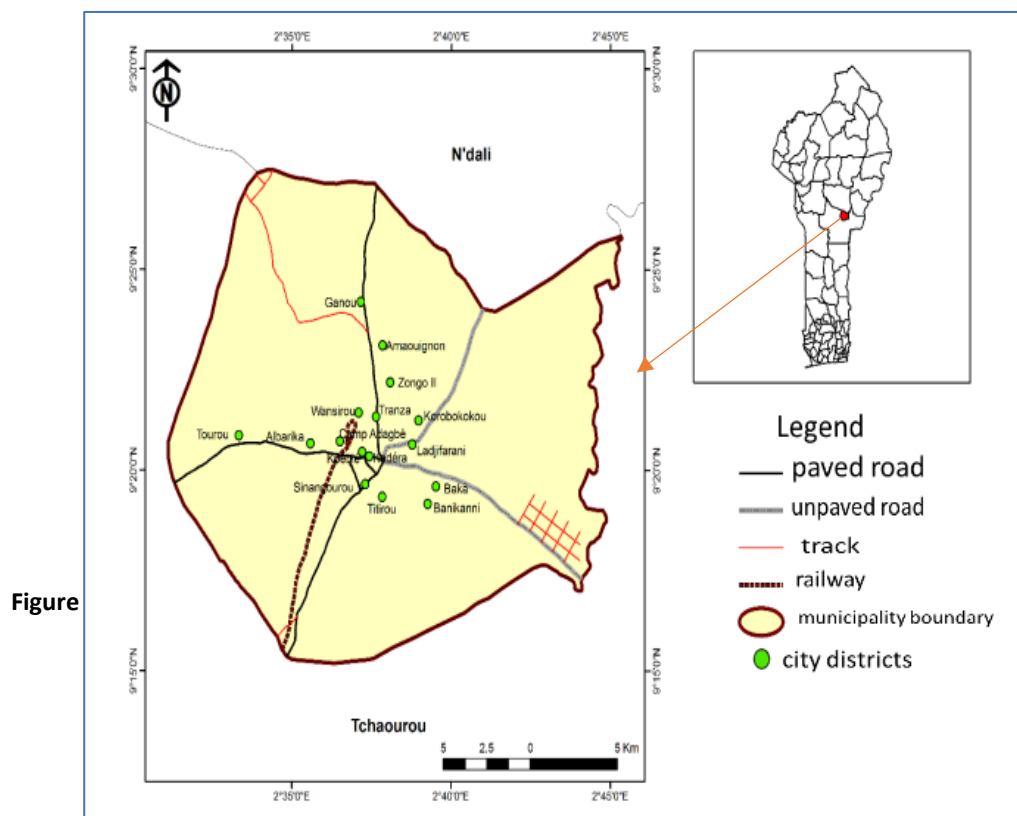
2021; Oladiran et al., 2020). Food packaging plays an important role in the acceptability and adoption of new foods and promotes food labelling; food labelling can help to mark healthy or highly processed foods or foods high in sugar or fat. Food labelling can thus play a key role in promoting healthy diets and combating non-communicable diseases (Silva et al., 2016; Todd et al., 2021). Packaging is the first visual contact element for the consumer and plays a key role in the choice of food by giving a representation of the quality of the product (Gómez, Martín-Consuegra and Molina, 2015; Fenko, 2019). It is an integral part of marketing and plays a role of advertising and informing of the consumer in addition to the role of protection (Elliott and Truman, 2020).

In the context of child malnutrition the present study aims to identify elements that could potentially communicate positive quality attributes on the child food packaging for mothers. A photovoice methodology is employed in order to make recommendations for the design of attractive packaging that inspires the confidence of mothers who are the buyers of nutritious foods for children under five.

## 2. DATA AND METHODS

### 2.1 Study area

This study was conducted in the commune of Parakou in northern Benin (9.3467°N, 2.6090°E). The departments of North Benin have a higher prevalence of malnutrition than the national average and are full of dry areas vulnerable to food production (Hafida, 2016). The commune of Parakou was chosen to conduct the study because it is the main city with special status in North Benin with 255 478 inhabitants (National Institute of Statistics and Economic Analysis -INSAE-, 2016) . It has the advantage of offering a diversity of socio-cultural groups with a corresponding diversity of design elements to consider. In addition, urban and peri-urban populations are accustomed to purchasing packaged children's food, as opposed to rural areas where communities encounter natural subsistence food environments made up of grown and harvested foods. (Downs et al., 2020 ; HLPE, 2018 ; Ahmed & Herforth, 2017).



Figure

## 2.2 Study design

A qualitative study was designed using photovoice's methodology involving women mothers of children under the age of five. The photovoice methodology is a participatory action research method that allows communities to reflect on the realities of their community in order to discuss local knowledge and considerations to drive new dynamics and policies (Wang, 1999). It captures, selects and discusses the perceptions and experiences of mothers that are often different from those of researchers (O'Halloran *et al.*, 2021; Wang and Burris, 1997). In the design of children's food packaging where mothers are the ultimate purchasers, taking in to account their perceptions and experiences could be a way to enhance the desirability and adoption of locally produced nutritious foods.

## 2.3 Women recruitment

Fifteen mothers of children under five years of age were recruited by consent according to the snowball method (Noy, 2008) to participate in the study. The first mother was identified in a health center for vaccination of children in the commune of Parakou. This mother referred the second mother to us and so on. The study project was presented to the mothers and those who accepted the participation criteria were enrolled in the study. Inclusion criteria were:

- Being a mother of children under five who buys packaged baby food;
- Be willing to share their knowledge on nutrition with other mothers of children;
- Have a cell phone that can take pictures;
- Give consent to participate in the study.

Exclusion criteria

- Women mothers not purchasing packaged baby food
- Women mothers who have not received consent from their husbands

## 2.4 Data collection

The women were invited to the Food Science Laboratory for information sessions and focus group discussions in December 2022. The photos were taken in the living environment of mothers in the commune of Parakou in December 2022.

### ***Introductory photovoice study session***

The introductory photovoice session took place with the recruited mothers. This session aimed to familiarize mothers to the concept of photovoice study and the meaning of elements that will be photographed in general and about attractive or interesting elements that represent “**something positive quality**” for them. Sample images were shown to the mothers and the following questions were discussed about the images:

- Which meaning the image / element has for you?
- What it would mean to you if you would see it on a child food package?
- How would you feel?
- What would it represent in that context?

Then, general instructions on taking photo, ethical rules and the use of smartphones for taking pictures were discussed.

### **Pictures taken by mothers**

The mothers had one week to take the photos of diverse objects or things that represent "**quality or positive thing**" for them in their environment. The photos taken were sent via WhatsApp to the research team and then printed.

### **Second focus group discussion**

A session to discuss the photos taken and select photos to include in the design of future child food packages was held with the mothers. Each participant explained how the objects photographed were chosen and the reasons for choosing these items. Then the photos were glued to the wall and each mother identify her photos taken. Each participant explained:

- why she photographed this object;
- how and why the photographed object represents quality or something positive for her;
- what significance does the photographed object have for her.

All the photos were spread out on the floor again. The participants were instructed to group the photos according to their own criteria. Then, the participants explained the reasons behind the groups formed. Finally, the participants were instructed to select the photos that they thought could be used on children's food packaging. The reasons for each choice were given by the participants. The mothers' various responses were recorded in a notebook and the session was audio-recorded using the recording function of a smartphone. These qualitative data were tabulated and then analyzed by synthesizing and transcribing.

## **3. RESULTS**

### **3.1 Characteristics of mothers**

The mothers included in the study all have at least one child under five. Each mother purchased at least one packaged food for her child at various frequencies (see Figure 2). Sixteen children's foods were mentioned as the most commonly purchased in the market. Cookies (all brands) and "*cerelac infant cereal*" (Nestlé) were the foods most frequently mentioned by mothers, with average purchase frequencies of 2.28 and 1.89 per week respectively.

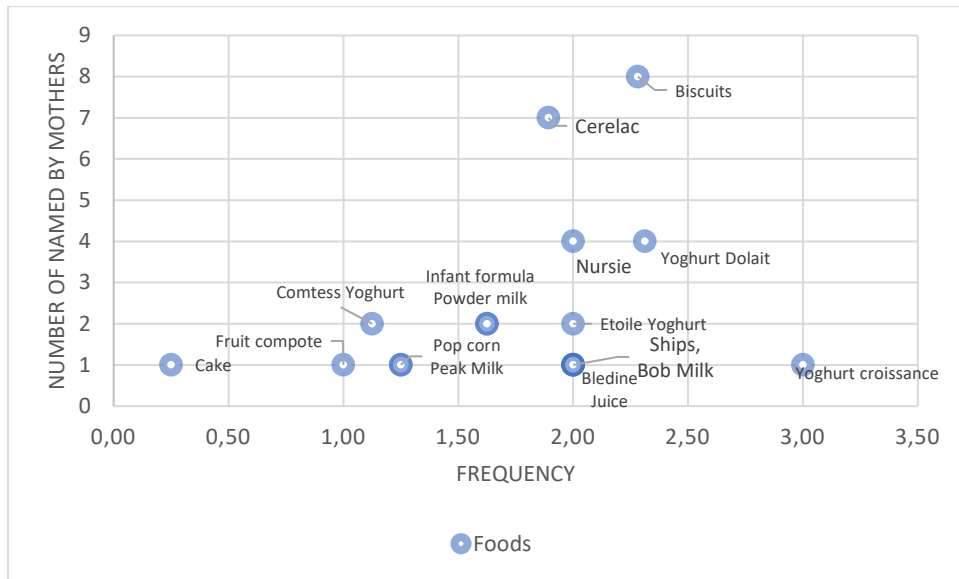


Figure 2: Feed purchased by mothers and mean frequency of purchase per week

### 3.2 Group of items photographed by mothers

65 photos of various objects were taken by mothers which were grouped into 9 groups by them according to the nature of the objects in the photos and their use. The patterns of the African cloths and the objects of nature (plants, flowers, and trees) are the most represented with 15 photos per group followed by the household utensils with 9 photos (figure 3).

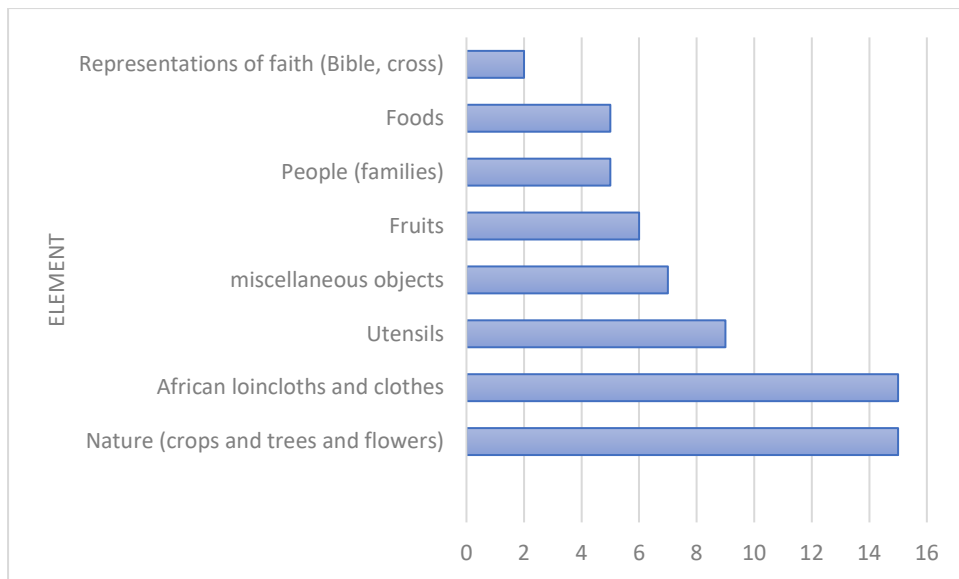




Figure 3: Grouping of photos in categories

### 3.3 Selected items and mothers' quality perceptions

Of the 65 photos on display, 13 were selected by the participants as representing something positive or quality and that could be used in the design of child food packaging (Table 1).


**Table 1:** Quality perception on the selected photos by mothers

Photos	Quality perception by mothers
 <p data-bbox="252 757 635 786">Photo 1: A son and his grandfather</p>	<p data-bbox="762 315 1345 685"><i>"Seeing my grandfather and son together with a wide smile and that confidence that the son exudes gives me joy in life. Seeing a similar image on a child's food package will create confidence and trust in me. It expresses a trust between the manufacturer and the woman. Using it would be a guarantee of good health for my child and therefore a happiness for me."</i></p>
 <p data-bbox="252 1048 647 1077">Photo 2: Pineapple and watermelon</p>	<p data-bbox="762 808 1345 1032"><i>"Fruit is an expression of good health. Seeing them on the packaging of children's food means that this food is also good for the health of the child. In addition, pineapple is a fruit that makes Benin proud internationally. "</i></p>
 <p data-bbox="252 1487 491 1516">Photo 3: Large plastic</p>	<p data-bbox="762 1099 1345 1368"><i>"We traditionally use jars to keep water in our homes. This big plastic came to replace them in the people who are rich. It takes over a symbol of prestige. To see it on a package of food for children represents for us something good, common and practical. "</i></p>
 <p data-bbox="252 1877 587 1906">Photo 4: Plastic to serve water</p>	<p data-bbox="762 1538 1345 1662"><i>"This plastic is necessary and practical to serve water. On a child food packaging, it expresses something common and good for us."</i></p>

Photos	Quality perception by mothers
 <p data-bbox="252 658 528 689">Photo 5: Oranges display</p>	<p data-bbox="762 271 1342 495"><i>“Oranges are the first fruit to be squeezed before the other foods are given to the children. It is known that oranges contain a lot of vitamins. On a package for children's food, it means that this food is rich in vitamins and good for the health of children.”</i></p>
 <p data-bbox="252 1097 663 1128">Photo 6: Women in vegetable garden</p>	<p data-bbox="762 710 1342 981"><i>“We see a woman in a vegetable garden. It is so beautiful! It shows the work that women do to feed the family. The garden is a source of healthy vegetables. On a package of baby food we think it is natural food; and everybody wants natural and healthy food for their child.”</i></p>
 <p data-bbox="252 1585 651 1617">Photo 7 : Children guarding roosters</p>	<p data-bbox="762 1149 1342 1323"><i>“It is recommended to give chicken meat to children. Seeing this picture on a child's package means something natural and good for the growth of children.”</i></p>
 <p data-bbox="252 1995 437 2027">Photo 8: Banana</p>	<p data-bbox="762 1637 1342 1814"><i>“The banana is a fruit rich in vitamins and minerals that is recommended for the health of all. Seeing it on a child's food package means that this food can help children to be healthy and grow normally.”</i></p>



Photos	Quality perception by mothers
 <p data-bbox="252 658 485 689">Photo 9: Papaya tree</p>	<p data-bbox="762 271 1342 495"><i>“Papaya is a fruit recommended for digestion and rich in vitamin A which is good for vision. This tree contains a lot of fruit which is a sign of abundance and fullness. On a package of food for children can mean a rich and complete food.”</i></p>
 <p data-bbox="252 1106 544 1137">Photo 10: Woman cooking</p>	<p data-bbox="762 710 1342 835"><i>“A woman in the kitchen shows that women take care of the house. Seeing it on a package highlights the role of women as artisans in child nutrition”</i></p>
 <p data-bbox="252 1509 480 1541">Photo 11: Fruit salad</p>	<p data-bbox="762 1158 1342 1328"><i>“It is a well-presented fruit salad. On a child's foods package, it shows that this food contains many vitamins and minerals good for children's health. It is also attractive.”</i></p>
 <p data-bbox="252 1984 480 2016">Photo 12: Wild fruit-</p>	<p data-bbox="762 1547 1342 1673"><i>“It is a wild fruit very loved by children. On a child's food package, means that the food is locally produced”</i></p>

Photos	Quality perception by mothers
 <p data-bbox="252 703 440 734">Photo 13: A child</p>	<p data-bbox="767 271 1337 443"><i>“This photo shows a smiling and healthy child. On a child food package, it means that this food is good for the health of children. It shows women the result they will get after using the food.”</i></p>

#### 4. DISCUSSION

The aim of this qualitative photovoice approach study was to identify the elements that could potentially communicate positive quality attributes on child food packaging for mothers. The study identified items of positive value to mothers that would be trust factors once on children's food packaging. The identification of these elements is an added benefit for local processors to design competitive child food packaging in a market dominated by imported child food (Dimaria *et al.*, 2018). The study identified 16 baby packaged foods commonly purchased by mothers and 13 items that represent something positive or have some positive value for women in their environment. The 13 items identified as having positive quality attributes by mothers are mainly people, fruits and vegetables, and household utensils. The represented people are grandparents and children who are apparently well. This choice may seem significant in the context of children's food. A healthy child may indeed represent a sign of good nutrition, while a grandparent expresses knowledge, wisdom and a trusting relationship. Furthermore, the choice of fruits and vegetables as items of interest by women is as relevant as their role in the diet and nutrition of children. Indeed, it is known that fruits and vegetables are excellent sources of essential vitamins and minerals in the nutrition of children (WHO & FAO, 2014). Overall, African loincloths dominate the list of basic items (65) and account for 23%. The dominance of loincloths could be explained by the role that loincloths play for African women. The loincloth is a cultural element in sub-Saharan Africa (Bicaba, 2011). One of the participants affirmed that *"in our country, we recognize the greatness of a woman by the quality of the loincloth she wears..."*. However, although the women did not select the photos of these designs as being suitable for use on child food packaging, we believe that they could be used as a background element in child food packaging design.

Our photovoice study related to child food packaging in Benin highlights several scientific values. Photovoice is a qualitative research method that uses photography to enable participants to represent their experiences and share their perspectives on a particular issue. Potential scientific values of a

photovoice study related to child food packaging in Benin include the understanding cultural and social factors. Our photovoice study provides insight into cultural and social factors that influence food packaging and consumption practices of mothers in Benin. This understanding can help design more effective interventions to improve child nutrition and health outcomes. Our approach also facilitates community engagement. Photovoice engages mothers as community members in the research process, enabling them to identify and prioritize issues that affect them. Involving local communities can ensure that child food packaging become more culturally appropriate and sustainable. The photovoice approach also generates ethnographic insights. By asking mothers to take photos of their daily lives and experiences, photovoice can provide ethnographic insights into the lived experiences of mothers and children in Benin. This can provide a more nuanced understanding of the factors that affect food packaging choices and consumption practices. Thereby our approach improves empowerment and advocacy of mothers. The photovoice approach empowers mothers to identify and address issues related to child nutrition and health in their communities. Mothers used the photos and narratives they create to advocate for change in their food environments. Overall, our photovoice study related to child food packaging provides valuable insights into the cultural and social factors that influence child nutrition.

Our study is not without limitations. Our results could be limited to the North-Benin zone, by the number of participants (15), and also by socio-economic status of women. Although this is a pilot study, it provides relevant information for local entrepreneurs producing children's food who are venturing into a globalized market.

## **5. CONCLUSION**

We have identified the quality items perceived by the mothers of children who are the purchasers of food for children in Benin. The items that represent the qualities for mothers are diverse. They are, among others, confidence, well-being, usefulness, health, contents related to the health of their children. Taking these elements into account in the design of future infant food packaging would increase the confidence of mothers and promote the acceptance of these foods.

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