Drinking to their health: Social analysis of a micronutrient-fortified beverage field trial

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Abstract

Anthropologic research was conducted among pregnant and lactating women in rural Tanzania in conjunction with clinical trials of a micronutrient-fortified beverage. Use of the beverage was examined through interviews and ethnographic observation in clinics and at home. Women liked the taste of the beverage, considered it beneficial to their health, preferred it to pills or injections, and most were willing and able to use it according to instructions. Most consumed the beverage according to schedule in the hope of improving pregnancy outcomes. However, public health facilities in Tanzania are not currently equipped to ensure regular delivery of micronutrient supplements, and many of the women with the worst nutrition profiles are also those who would be least able to purchase supplements on the open market. Successful distribution of micronutrient supplements in forms that appeal to consumers, such as a fortified beverage, will require programmatic attention to locally appropriate social marketing and to the challenges of reaching those with extremely low incomes.

Key words: Compliance, fortified beverage, medical anthropology, micronutrient malnutrition, product acceptance, social analysis

Research objectives

This paper discusses the anthropologic component of a micronutrient-fortified beverage field trial in Mpwapwa, Tanzania [1], which was conducted in association with clinical trials detailed elsewhere in this supplement [2] (see Box 1). The United Nations Children's Fund (UNICEF) funded research conducted in 1999 and 2000, in close cooperation with nutritionists and technicians from Cornell University (Ithaca, New York) and the Tanzania Food and Nutrition Centre (TFNC), during the clinical-trial period with expectant and nursing mothers. The anthropologic component was initiated to determine how such a beverage or similar micronutrient package would be accepted and consumed if clinical data indicated the program should go to scale. Among the study objectives, we sought to learn from and avoid common development pitfalls, investigate social reaction to the micronutrient beverage, and investigate potential obstacles to widespread distribution of such a product in East Africa.

In designing the study we sought to make recommendations that would be both practical and pos-

BOX 1. Efficacy trial of a micronutrient dietary supplement in pregnant women in Tanzania

Food technologists at The Procter & Gamble Co. (P&G) produced both the micronutrient-fortified beverage mix and an identical tasting and looking nonfortified beverage mix, which served as the experimental and placebo treatments respectively. For the pregnancy study, two types of sachets were used with one colored green and labeled "G" and the other colored blue and labeled "H." Neither the researchers nor the study participants were aware of the identity of the package contents. The composition of the supplement in each sachet had been agreed to after extensive consultation by nutritionists at Cornell University, Tanzania Food and Nutrition Centre (TFNC), Micronutrient Initiative (MI), United Nations Children's Fund (UNICEF), and P&G and is further detailed by Latham and others elsewhere in this volume.

Sources: Ash et al. [1], Makola et al. [2].

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Mention of names of firms and commercial products does not imply endorsement by the United Nations University.

sible for the intended beneficiaries. Examples of well-intentioned projects gone awry abound in international health and development activities. However, when projects incorporate social scientific analysis into their structure, efforts to introduce and encourage beneficial but unfamiliar activities have an increased likelihood of being effective.

The social science component of the current research was intended to raise questions about the viability of introducing a multiple-micronutrient–fortified beverage into poor areas in ways that might reach the mothers and children with the worst nutritional profiles. Research questions included the following: Did women find compelling reasons to use the beverage? Did they find ways to work it into their daily routines? Did they seek to share its potential benefits with their children? Did some sell the powder to raise cash? Did they have problems keeping the powder safe from pilfering? Did other household members help or hinder women's use of the beverage? Also, given all the other competing demands on impoverished consumers' time and resources, how might a market for such a product be encouraged? And, finally, what additional structural obstacles would need to be overcome in the health sector in order for widespread distribution to be a success?

Study design: applying anthropology to micronutrient research

With these questions in mind, an anthropologic research project was launched that looked very different from the clinical trials to which it was attached. The variables in subjects' lives that epidemiologic research seeks to control for are the very ones that anthropology seeks to highlight. Whereas clinical research relies on the collection of measurable physiologic data, anthropology investigates unquantifiable factors through discussion and observation. While epidemiologic research requires appropriate, often large, sample sizes to have the statistical power to make valid conclusions, anthropology in complex societies is at its best when it delves deeply into the lives of a relatively small sample of a larger population. When clinical studies prick and poke subjects for blood samples and parasite counts, anthropologic research tries to set subjects at ease so they will express thoughts that they would otherwise keep hidden from outsiders and authority figures. When conducted in tandem, we found these two very different types of research to be quite complementary.

The anthropologic study was designed to get people talking. We first met with most of the women immediately after their initial clinical screening, introducing them to the beverage while engaging them in friendly banter. In this way a relationship was established that was followed with home visits in many cases. The home visits generally lasted 30–90 minutes. We conducted semi-structured interviews, meaning we made sure to discuss certain crucial topics centering around individual impressions of the beverage and circumstances of its use, while also allowing conversation to include topics ranging from life histories to breastfeeding and birth planning to household economics. We could not, given the time available, collect quantitative data that would enable us to say that, for example, "X" percent of women would purchase a micronutrient product at price point "Y." With these parameters in mind and by following accepted anthropologic methods of participant observation, we can say, however, that the information we gathered is broadly representative of families in Tanzania and, by extension, is relevant to much of eastern, central, and southern Africa.

At the same time that we were talking with women and their families about where the micronutrient beverage fit in their lives, we were also talking with health personnel and observing health service facilities. We did this because many health programs are based on the assumption that health services will be delivered in remote areas in ways that correspond closely with planners' intentions. By observing health services as they are actually available to a not atypical set of Tanzanians, we were able to identify some of the issues that will affect the logistics and supply side of micronutrient-supplement distribution in this part of the world, beyond the immediate questions of consumer acceptability uncovered by the work with study participants.

Key findings: favorable and cautionary

The key findings that most gratify the team that formulated the micronutrient beverage are that most women liked it, preferred it as a delivery vehicle over pills or injections, considered it beneficial to their health, and were willing and able to use it according to instructions. When viewed in conjunction with the physiologic data presented by Latham [3] and others [2], the findings present a strong argument for going forward with a micronutrient beverage in East Africa. There is a second set of findings that is equally important, though, and is somewhat cautionary. These findings center around the fact that the women and children with the worst nutrition profiles, who would therefore benefit most from a supplement like a micronutrient beverage, are also by and large the poorest, most politically marginal members of society who would be least able to afford any daily cost of purchasing such a product.

Though the specific social relations of poverty we found in this research are unique to East Africa, these findings will hold for much of the rest of the world and should therefore be a topic of serious consideration for

any public or private organization pursuing the distribution of such a product to poor consumers who are at risk of micronutrient deficiency.

Favorable findings

The first set of findings is clear. Women liked the beverage, and they and their families did all they could to ensure that they consumed it on a regular basis. While many studies of "compliance" find low adherence to tablet regimens [4], we found that 74% consumed between 75% and 100% of their beverage sachets (with a mean consumption in these top three quartiles of 110 out of 112 possible sachets) and 92% consumed at least one-half of their sachets (with a mean consumption in the top two-thirds of the bottom quartile of 83 out of 112 sachets, or 74%) (table 1).

Most women found the taste pleasant, mentioning that it is similar to a popular flavor of soda. Their reasons for drinking the beverage had little to do with a craving for orange-flavored drink mix, though. Rather, most responded to the suggestion by medical experts that the product could have health benefits for themselves and their babies.

Most of the women in the study were from households that relied on farm products, petty trade, and casual labor to bring in about $10 (US dollars) per month per person, to meet all household needs for food, medicine, education, clothing, and shelter. Within their families, most women had little power to direct household resources toward their health. Unmarried pregnant women, who were perceived to be "soiling" the household, had even less claim than most for family support. Many of the women, therefore, willingly accepted the beverage as something they could use to improve their health that did not require approval from family members with greater authority over resources.

Equally significant is that other family members also were eager for the pregnant women among them to use the product. Husbands, sisters, and mothers-in-law all helped protect the product for the pregnant women and made sure they drank the beverage according to the daily schedule and got their refills every 2 weeks.

TABLE 1. Compliance of supplementation of two servings per day during the first 8 weeks of the study

Number of Packets[a]		Consumption[b] *n*/*N* (%)
Mean	Range	
0	0	2/318 (0.6%)
28	25–28	7/318 (2.2%)
55	44–56	15/318 (4.7%)
83	64–84	58/318 (18.2%)
110	86–114	236/318 (74.2%)

a. Number of sachets consumed during first 8 weeks of study is based on the number of empty packages returned during follow-up.
b. Proportion of mothers who consumed stated amount.

Children are central to Tanzanian social life, and most adults were enthusiastic about having a product available that might help offspring survive pregnancy and infancy. In a country with an estimated infant mortality rate (IMR) of 99/1,000 live births [5], in which it is not uncommon for a woman to have only a few children reach adulthood from as many as a dozen pregnancies, both pregnant women and their families were eager to do what they could to shift the odds in their favor.

In local parlance, the beverage was discussed as something that could "increase blood." People agreed that certain foods could increase blood, including scarce foods like meat and sporadically available foods like dark leafy vegetables. (Parenthetically, we therefore recommend that any micronutrient supplement manufactured for the East African market be available in a dark purple formula.) Few families, though, normally made special efforts to use diet to increase the blood of pregnant women until very late in the pregnancy, just before the anticipated blood loss during delivery. The information we gave—that increasing blood early in pregnancy could help mother and baby and that increasing the blood of nursing women might improve the quality of the milk for the infant—was not part of local ethnomedical understandings prior to the study. However, when given this information, most people evaluated it and incorporated it into their models of physiologic processes.

Families were then eager to adopt the beverage for pregnant women, because it was a non-cumbersome way to achieve the revised goal of increasing the mother's blood during and after pregnancy. Similar information regarding health benefits for children would stimulate demand for feeding micronutrient supplements to children. Though understanding of diet and bodily processes will vary from place to place, thus making research about local health conceptions important before implementing micronutrient-supplement programs elsewhere, the central objectives of improving maternal and child health will be shared by many poor families worldwide.

Cautionary findings

The second, cautionary set of findings presents much more of a challenge to those who wish to promote micronutrient supplements. These findings will also vary in their particularities from place to place, but will present similar obstacles overall throughout the non-wealthy world. Chiefly, the public supply stream is often broken, and the main consumer base consists of those people least able to allocate the cash needed to support a private micronutrient-supplement industry. Health services and supplies are largely inadequate in Tanzania, as they are in impoverished areas from Peru to Haiti to

Indonesia—preventive health care is minimal where doctors are few, facilities are Spartan, and supplies are scarce even for emergency medicine. In a country like Tanzania where even free medical supplies—such as the iron-folate tablets that are supposed to be available for pregnant women—often do not reach their intended recipients, any model of public distribution of micronutrient supplements will need to confront aggressively the serious institutional and supply stream weaknesses that currently prevent women and children from accessing many of those public health services that are nominally available to them.

Additionally, when considering a private model of selling micronutrient supplements directly to consumers, we found that the best of intentions to purchase such a product will often crash against the realities of household economics in impoverished areas. A basic graph of supply and demand, drafted with rough figures, indicates a fundamental fact of economics—in a totally free market, some consumers will always be left out. In the case of micronutrient supplements, the people who can least afford the cost of the product are exactly the "target demographic" with whom we ought to be most concerned (figures 1 and 2).

When food is a daily struggle, as it is especially in female-headed households, supplements will necessarily be a lower priority than food or medicine. When women have restricted access to household income, as in many households with a strong patriarchal organization, it is difficult for them to make the independent decision to purchase supplements for themselves or their children. Among the 64% of women we tested with hemoglobin concentrations indicating moderate-to-severe anemia, many reported having resources available, either through their own small income or family decisions about household expenditures, to only eat nutrient-rich foods such as meat, eggs, or milk as seldom as once or twice a month. Even the staple diet, maize meal and beans, can be difficult to afford during the leanest months. As much as mothers and children may like a fortified beverage or other micronutrient product, whether for flavor or for anticipated health benefits, a private company would face considerable obstacles in creating a viable business model selling to the poorest groups with the least nutritious diets.

Applying the lessons: research into action

What we found through anthropologic research with the women in the study and through evaluating their health-services environment is a substantial challenge. Women and children enjoy drinking a micronutrient-fortified beverage. Families with good information appreciate the importance of improving the health profiles of mothers and children through the regular use of micronutrient supplements, and appropriate social marketing can inspire them to go to great lengths to acquire them. However, public distribution of such supplements can become mired in existing inefficiencies, and private sales will often miss the most important markets—in effect, micronutrient supplementation programs risk resembling other well-intentioned programs that assume rather than analyze and address the situational realities of consumer demand.

Overcoming these challenges should be of central concern in discussing the future of public-private partnerships in micronutrient supplementation. By working together on the beverage, for example, The Procter & Gamble Co. (P&G), Micronutrient Initiative (MI), UNICEF, TFNC, and the Cornell team developed a product that appeals to consumers and is relatively inexpensive to produce. Other products might be even less expensive to produce, such as fortified mixes for the family cooking pot or nutrient pre-mixes that can be ground into staple foods at the community grain mill. Careful social science research can establish whether

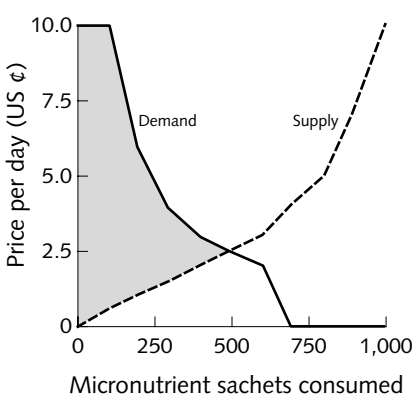

FIG. 1. Model supply and demand curves showing met demand

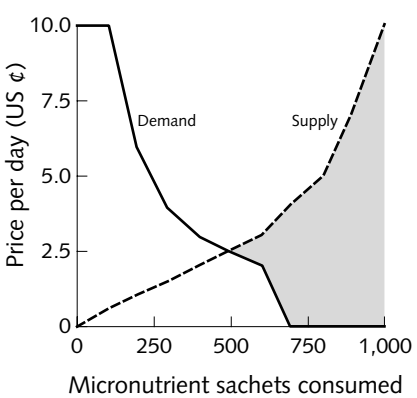

FIG. 2. Model supply and demand curves showing unmet demand

such products are attractive to consumers in various international markets.

Where public and private organizations can then proceed to collaborate to good effect is in the transition beyond the general notion that such a product is tasty and beneficial, toward stimulating consumer demand for micronutrient products and establishing effective distribution models. Marketing activities should not simply aim to motivate consumers to want the product, but must also address ways in which it is practical for the neediest consumers to obtain it, especially the many rural poor who are so often missed by campaigns designed in urban centers. For example, partners can undertake innovative social marketing campaigns with NGOs to expound on the benefits of micronutrient supplements for mothers and children, not only through media campaigns for urban consumers but also through rolling, face-to-face rural outreach programs featuring community theater, music, and non-didactic adult education. At the same time, it is vital at the outset to consider subsidizing the availability of micronutrient products at crucial contact points such as maternal and child health clinics, schools, kindergartens, refugee camps, or hospitals. Such educational and distributional efforts would raise awareness of micronutrient health and supplementation, stimulate a demand for such products on the open market, and also reach those consumers who can most benefit from and least afford to purchase micronutrient products.

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