

Identifying Nutrition and Health-Relevant Behaviors, Beliefs, and Values of School-Going Adolescent Girls in Rural Bangladesh: Context for Interventions

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ABSTRACT

Background: Focusing on adolescent schoolgirls in rural Bangladesh, this study aimed to describe the nutrition-relevant context required for effective intervention planning. It included attention to dietary behaviors, daily schedules and activities, and girls' beliefs and values. We placed a special emphasis on iron because anemia has been identified as a significant problem in adolescent girls in Bangladesh.

Objectives: The study was undertaken to inform a larger project to develop a replicable model for integrating nutrition activities into the multiple social programs in BRAC, a large nongovernmental service delivery organization in Bangladesh.

Methods: Following an initial phase of exploratory key informant interviewing, data collection was conducted through the use of focused ethnographic methods in 2 additional phases. Phase II consisted of in-depth interviews with school-going adolescents in rural communities in Rangpur District ($n = 23$). Interview modules included sociodemographic information; a qualitative 24-h dietary recall; respondents' concepts of "health," "healthy foods," and "anemia"; exposure to nutrition messages and ratings of their importance and feasibility; and actions to maintain health. In phase III, ratings and other data were collected systematically from a separate sample of 20 adolescent girls. Analyses included thematic analysis of transcribed and translated text and quantitative analysis of numeric data.

Results: Key findings include evidence that school-going girls consume a variety of foods and have substantial knowledge about good health and nutrition practices. However, we also found beliefs and practices that challenge the development of nutritionally sound food practices, including iron nutrition. The study revealed the importance of teachers and mothers as information sources, and the dietary and cultural roles of purchased snacks, which occur in connection with school attendance.

Conclusions: These findings, together with insights about girls' values, particularly conceptions related to "a healthy life," have implications for expanding BRAC activities to support the nutrition of adolescent school girls. *Curr Dev Nutr* 2019;3:nzz013.

Introduction

Until recently, nutrition of adolescent girls has been a neglected concern in global health, nutrition research, and programmatic action to improve nutrition (1). Paradoxically, in spite of the fact that pre-pregnancy nutritional status is widely understood to be important for pregnancy outcomes, the neglect of adolescent nutrition has included cultures in which early marriage is normative and prenatal health care services are well established. In many settings, including those in which teenage marriage is common, teenage girls only receive nutrition



Keywords: adolescents, girls, nutrition, food choices, iron, ethnography, school food, snacking

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Abbreviations used: BCC, behavior change communications; BRAC, no longer an acronym—formerly the Bangladesh Rural Advancement Committee; FES, Focused Ethnographic Study.

services after they become pregnant and are incorporated into the usual public health prenatal care activities. Even in these settings, recognition of their special nutritional needs is often beyond the capacity of prenatal services to provide. Fortunately, the ubiquitous neglect of adolescents in low- and middle-income countries, including girls who are not married or pregnant, is changing rapidly. There is also a small but growing evidence base of social and epidemiologic literature on the nutrition, health, and mental health of this important population sector (2).

Throughout South Asia, where early marriage and early childbearing is still common, agencies and social action groups concerned with human rights and women's education have been working for decades, legally and socially, to change normative practices (3). In Bangladesh, these efforts are reflected in increasing rates of secondary school attendance by girls, not only in cities but also in rural communities (4). Consequently, the population of "school-going girls" in Bangladesh is becoming a numerically significant social group from the perspective of nutrition planning. This paper presents the results of an ethnographic study of nutrition-related behaviors beliefs and values of schoolgirls in a rural area of Bangladesh.

The study presented here is part of a larger research effort that was undertaken in Bangladesh as a collaborative effort by Nutrition International (NI) and BRAC. BRAC is a nongovernmental organization that was established in 1972 to foster household economic development and well-being, as well as education and health by providing direct services to communities, households, and individuals. Part 1 of the study was an analysis of the full complement of BRAC programs through a "Program Impact Pathway" analysis (5) of the BRAC program delivery systems to identify opportunities to add potential "handovers" of nutrition-related activities. Part 2, the subject of this paper, consisted of an ethnographic investigation to identify and understand adolescent dietary behaviors, beliefs, and the sociocultural contexts of their lives, which would serve to inform and guide the development of interventions to promote better nutrition in an integrated program. To reduce the research effort to manageable proportions, the study team decided to limit the ethnographic research to a specific district and a specific group of beneficiaries. The decision to focus on school-going adolescent girls was motivated, in part, by a desire to support BRAC services directed to this subgroup, but also to use the study to increase the pool of knowledge in a neglected area of global nutrition.

As the purpose of the project is the integration of nutrition activities into BRAC programs, the adolescence study placed a primary emphasis on nutrition and food. Within that focus, the team decided to give special attention to anemia as this issue had been previously identified as a problem in adolescent girls in Bangladesh (6). The results of a desk review of the nutrition situation in Bangladesh, which the integration project commissioned to provide background for the larger project (Monalisa, unpublished), suggested that relatively little is currently known about the dietary and social dimensions of anemia in adolescent girls in Bangladesh. Therefore, to facilitate the development of future BRAC interventions for adolescent girls, it was particularly important to examine beliefs, values, and diet-related behaviors relevant for addressing iron intake and anemia.

Methods

Research design

We used an ethnographic approach, as contrasted, for example with a dietary and social survey approach based on prestructured questions, because we felt that a mixed-method ethnography would produce the insights the study team needed to identify interventions within the existing BRAC framework, suggest potential new activities for BRAC, and facilitate the design and content of behavior change communication (BCC) activities to support integration. Secondly, as an implementation research activity, the study had to be conducted quickly and economically. A primary advantage of ethnographic techniques is that they enhance the likelihood of obtaining respondents' emic perspectives, minimize the danger they will report what they think the interviewer wants to hear, and can yield new insights that are useful for identifying and expanding integration intervention activities.

We employed mixed-method research procedures, which were modeled on the study design and protocols of the Focused Ethnographic Study (FES) for nutrition that was developed under the auspices of the Global Alliance for Improved Nutrition (7). The original FES research protocols for nutrition were developed for infant and young child feeding and can be adapted to other population groups (e.g., pregnant and breastfeeding women or adolescents). The FES method utilizes a multiphase, iterative approach that rests on in-depth individual interviews with small samples and makes use of several ethnographic techniques (8). Typically, the first phase of an FES consists of exploratory interviews with key informants, who include a range of different types of people (mothers, health care workers, program administrators, etc.). Phase II consists of respondent interviews in samples of 20–30 individuals. It is often necessary to have a phase III to follow up on issues that emerge in phase II. The results presented in this paper are from phases II and III.

The research design and the methods that were used to obtain and analyze data are intended to yield both emic and etic insights into school-going adolescent girls. The terms "emic" and "etic" have their origins in anthropologic theory (9–11). They refer, respectively, to the perspectives of the members of a culture (the "insider perspective"), which consists of culturally based beliefs and values, and the perspectives of the investigators, which are derived from the analytic theories and categories of their disciplines and scientific literature. The study design, research protocols, and informed consent procedures were approved by the Ethical Review Committee of the James P Grant School of Public Health, BRAC University (Ethics Reference No. 94, dated 27 December 2016). Respondents were not given monetary or other compensation for participating in the study.

Sample

The study was conducted in rural areas of Rangpur District, which is situated in Rangpur Division in northern Bangladesh. The sample of respondents for the phase II extended, in-depth interviews consisted of 23 girls aged 14–17 y who were enrolled in secondary school at the time of the interview. Four of the 23 school-going girls were married at the time of the interviews, but the majority (19 of 23) were unmarried girls living at home with their parents. To recruit

the sample, the interview team was assisted by local health and community workers to identify adolescents who they felt were socially and socioeconomically representative of families in the communities where they worked. Because these workers were usually associated with BRAC, our recruitment procedure could have biased selection towards more articulate, knowledgeable respondents if workers sought to show their own health education efforts in a positive light. Respondents, for their part, might also have felt obliged to provide responses that were consistent with the messages promoted by the community health workers.

Interviews were conducted by 2 teams of 2 people (an interviewer and note-taker) who were not associated with BRAC and who were trained and supervised by 2 of the authors (JL and MIB). Phase III recruitment of an additional sample of adolescent girls ($n = 20$) for a structured rating exercise, with probing to obtain respondent rationale for ratings, used the same method to select the respondents.

Data collection

After obtaining informed consent, interviews were audio recorded. Data collection was conducted with the following ethnographic modules:

- A module to obtain broad-based sociodemographic information about the respondent's household, including household composition, sanitation facilities, agricultural activities, and related social behaviors.
- A module that began with a qualitative 24-h dietary recall (including timing and location of each "eating event,") followed by questions on ingredients, food preparation techniques, and the respondent's role (if any) in the preparation of the foods for each of the items listed by her. As some of the girls were interviewed on or after the weekend, and the recall period did not cover a schoolday, we supplemented the 24-h recall with additional questions about what was normally eaten at school.
- A module to explore respondents' concepts of "health" and "healthy foods." The items for this module were obtained in phase I from adolescent key informants through the use of a cognitive mapping "free listing" technique (12, 13).
- A module to elicit respondents' ideas about anemia.
- A module to assess respondents' exposure to the nutrition messages used by BRAC in its various programs, and a module to assess respondents' perceptions about the importance and feasibility of the messages by asking them to rate messages first by importance and then by feasibility.
- A module that uses the free listing technique to obtain a list of the actions each respondent employed to maintain her own health.

Data analysis

The audio recordings of the interviews were transcribed into Bangla and translated into English by the field teams. Two members of the Bangladesh field team made the initial analysis of the quantitative data. Thematic text analysis of the interview transcripts was conducted by the advisory team in consultation with BRAC personnel, through the use of procedures recommended by Saldana (14) based on the well-established approach of Glaser and Strauss (15). Cognitive mapping data were analyzed with the use of open-source Anthropic software for Windows (16). The analytic procedures involve a mix of qualitative and

quantitative techniques to yield both emic and etic perspectives (13). The rating technique we used to analyze the results of the piling sorting data followed the method developed and recommended by Weller and Romney (17).

We created a "food salience rating" through the use of the following procedure: 1) in a free listing exercise, we asked girls to list the foods they felt were particularly healthy for them; and 2) with the data from the free listing, we constructed a "food salience rating" by combining: i) the frequency with a food is listed and ii) the average position of that food in the sequence of foods they listed.

Results

Diet and food consumption patterns

Foods in the diet.

To illustrate typical intake and consumption patterns, Table 1 presents detailed examples from 5 respondents for the 24-h dietary recalls (the full results are available on the Supplementary Materials). Summarizing the results for the full sample, we found that all food groups are represented in the girls' diets, except for fruits. Almost all the girls had consumed some animal-source foods in the previous 24 h. Also present in the diets are multiple sources of vegetables and fiber. Carbohydrates are largely from unrefined sources. The diets appear to be low in fat, but, as girls were not asked to report quantities, total energy could not be estimated from these data.

With respect to iron, the results of the 24-h recall indicate that the adolescent schoolgirls in our sample consumed both animal-source and nonanimal food sources of iron. Animal-source foods had been consumed by 91% of the girls in the previous 24 h. The food sources break down as follows: 65% had consumed fish, 48% had consumed eggs, and 52% had consumed meat (mostly beef or chicken). Just over half (56%) of the girls consumed foods from >1 of these categories in the same day. Of the 2 girls whose recalls showed no animal source foods, 1 consumed foods rich in nonheme iron, leaving only 1 girl who had not consumed iron in some form the previous day. As with total energy, iron intake could not be quantified because we did not ask the respondents to estimate quantities.

Where food is consumed.

Turning to the spatial pattern of food consumption, we found that consumption takes place almost entirely at home, at school, or in the vicinity of the school. The secondary schools in the study areas do not provide school meals or have dedicated lunch rooms. Consequently eating at school typically involves snacks that are either brought from home or purchased from vendors who bring them to the school or from kiosks adjacent to the school. Although it is not uncommon to bring a snack from home (22% reported doing this), the majority of girls are purchasing snacks. A possible constraint to bringing food from home is that most of the dishes their families prepare are cooked foods not readily transported or eaten cold. Some respondents also expressed concern about creating a "mess" in their schoolbags with oily food brought from home.

Girls who did not bring food from home reported spending a weekly average of 84 Bangladeshi taka on school snacks—a sum that is not inconsiderable, given that an unskilled rural laborer in Bangladesh

TABLE 1 Examples of foods eaten by adolescent girls during different times of the day: first 5 responses from the 24-h recall survey

| | Breakfast | | Between breakfast and lunch | Lunch | Between lunch and dinner | Dinner |
|---|---|---|---|--|---|---|
| | Before | During | | | | |
| 1 | Fried polished rice (rice, sugar) | Rice, fried bitter melon (oil, pepper, onion, ginger, spice, potato, turmeric, salt) | — | Rice, fried bitter melon (oil, pepper, onion, ginger, spice, potato, turmeric, salt) | — | Rice, chicken (garlic, ginger, pepper, onion, spice, turmeric, salt, oil), small fish and small potato fried (pepper, onion, oil, turmeric, salt) |
| 2 | — | Rice, mashed potato dal (chili, turmeric, spice, cumin, black cardamom, small cardamom, cloves, cinnamon, black pepper, potato), fried egg (chili, turmeric, salt, oil), chicken (garlic, spice, turmeric, salt, oil, coriander powder) | — | Rice, mashed potato dal (chili, turmeric, spice, cumin, black cardamom, small cardamom, cloves, cinnamon, black pepper, potato), fried egg (chili, turmeric, salt, oil) | — | Rice, bottle gourd curry (chili, onion, salt, turmeric, spice, coriander powder), fried potato (chili, spice, turmeric, salt, oil) |
| 3 | — | Rice, bottle gourd curry (fish, salt, turmeric, onion, spices, pepper, cumin, <i>pach poron</i> , other spices), fried bitter melon (salt, turmeric, onion, spices, pepper, oil) | — | Rice, bottle gourd curry (fish, salt, turmeric, onion, spices, pepper, cumin, <i>pach poron</i> , other spices), fried bitter melon (salt, turmeric, onion, spices, pepper, oil) | — | Rice, mashed potato (fish, potato, salt, turmeric, onion, spices, pepper, cumin, <i>pach poron</i> , other spices), fried bitter melon (salt, turmeric, onion, spices, pepper, oil) |
| | — | Rice, fried beans with potatoes (chili, onion, oil, turmeric, spice), egg, fish (salt, oil, turmeric, onion) | — | Rice, fried beans with potatoes (chili, onion, oil, turmeric, spice), egg, fish (salt, oil, turmeric, onion) | — | — |
| 4 | Bread, <i>semai</i> (sugar, milk, water, spice, bay leaf) | Rice, beef (salt, turmeric, spice, ginger, garlic, pepper, oil, onion) | Biscuits, <i>chanachur</i> (puffed rice, oil, lentils, onion, pepper) | Rice, beef (salt, turmeric, spice, ginger, garlic, pepper, oil, onion) | — | Rice, spinach (gourd leaf, onion, pepper, garlic, salt, oil), lentils (red gram), mashed potato (oil, garlic, onion, pepper, salt) |
| 5 | Bread, <i>semai</i> (water, milk, sugar), biscuits, <i>chanachur</i> (flour, salt, and peanuts), Horlicks (Horlicks, milk, sugar) | Rice, fish curry (spices, salt, oil, cinnamon, cumin seeds, cardamom), boiled egg | — | Rice, fried fish (salt, turmeric, oil), lentils (oil, spices, cardamom, cinnamon, salt, turmeric), mashed potato (boiled potatoes, salt, chili, onion, mustard oil) | Tea (milk, sugar, cardamom, cinnamon), biscuits | Rice, lentils (oil, spices, cardamom, cinnamon, salt, turmeric), chicken (salt, turmeric, oil, cinnamon, onion, ginger, potato), milk |

might expect to earn just 150 Bangladeshi taka per day. **Table 2** shows the snack foods that girls like to purchase. Although the list includes several commercially produced items (e.g., biscuits, sweets, and chocolate), it is notable for the heavy presence of savory “locally made,” mostly deep-fried snacks, often made from chickpeas, peanuts, and lentils.

Beliefs and knowledge

In this section, we summarize results that relate to cultural beliefs and knowledge. In our view, the 2 concepts—“beliefs” and “knowledge”—are not “contrastive” terms. As described previously by Pelto and Pelto

(18), “All people, whether biomedically trained health professionals or rural villagers, have cultural belief systems about the causes of sickness and remedial measures. The belief systems of professionals are supported by substantial empirical evidence, but they are beliefs all the same, and the beliefs are revised in the light of new information” (p. 149). Therefore, we have titled this section “Beliefs and knowledge.”

There is a strong consensus about foods that are healthy for girls to consume. **Table 3** shows the food salience results. Here we see that vegetables (especially leafy greens and amaranth), eggs, and fish are particularly salient “healthy” foods. Of note is that these are all locally accessible foods. These are also the subject of various nutrition

TABLE 2 Favored purchased snacks reported by school-going girls (n = 23)

| Item | n (%) |
|---|---------|
| Singara (aka samosa: wheat flour with potato, chickpea, carrots, and peanut; deep fried in oil) | 14 (61) |
| "Mixed puffed rice" | 13 (57) |
| Biscuits | 12 (52) |
| Puri (small, round bread made of wheat flour and lentils; deep fried in oil) | 7 (30) |
| Cake | 7 (30) |
| Chanachur (spicy mix of dried ingredients, including fried lentils, peanuts, chickpea flour, noodles, corn, chickpeas, flaked rice, fried onion and curry leaves) | 5 (22) |
| Piyazu (red lentils with green chili, onion, turmeric powder, garlic, salt and deep fried in oil) | 5 (22) |
| Pickles | 4 (17) |
| Bread | 4 (17) |
| Fuchka (fried puff-pastry balls filled with spiced mashed potato, boiled gram, spiced water, and tamarind juice) | 3 (13) |
| Chocolate | 3 (13) |
| Porata (flat bread that is fried in a pan with oil) | 2 (9) |
| Samocha (fried snack made with flour, potato, onions, lentils) | 2 (9) |
| Sweets | 2 (9) |
| Burger | 1 (4) |
| Chatpoti (mix of chickpeas, potatoes, onions, and chilies and tamarind juice) | 1 (4) |
| "Soft drinks" | 1 (4) |
| Laddu (ball-shaped sweets made of flour, sugar, milk, and other ingredients) | 1 (4) |
| Instant noodles | 1 (4) |
| Cucumber | 1 (4) |
| Pattis (small flat cake of minced food, especially meat) | 1 (4) |
| Juice | 1 (4) |

education efforts in the community that are directed to families by BRAC, as well as by other community organizations.

Beliefs and knowledge about anemia: girls' understanding of anemia is incomplete.

The girls in our sample were familiar with the signs of frank anemia, such as tiredness and pallor. They have a variety of names for the condition, all of which refer to a state of "blood insufficiency." However, only a minority (30%) related this condition to food quality. Of the other 70%, half could think of no cause at all.

Although girls expressed uncertainty about which foods are iron rich, some of their ideas on the matter are accurate. In the course of interviews, girls frequently said they were unsure which foods were rich in iron. **Table 4** presents the results of the phase III rating exercise

TABLE 3 Foods considered by girls (n = 23) to be particularly healthy

| Food item | Responses (%) | Average rank | Salience |
|-------------------------|---------------|--------------|----------|
| Leafy greens | 20 (87) | 2.5 | 0.658 |
| Egg | 18 (78) | 3.5 | 0.482 |
| Milk | 17 (74) | 4.24 | 0.366 |
| Red amaranth | 15 (65) | 3.07 | 0.426 |
| Vegetables | 14 (61) | 3.29 | 0.363 |
| Fish | 14 (61) | 2.36 | 0.487 |
| Meat | 11 (48) | 3.64 | 0.302 |
| Fruit | 8 (35) | 4.38 | 0.124 |
| Lentils | 8 (35) | 6.5 | 0.073 |
| Chicken | 4 (17) | 5.25 | 0.052 |
| Water | 1 (4) | 7 | 0.011 |
| Rice | 1 (4) | 7 | 0.011 |
| Hotchpotch ¹ | 1 (4) | 3 | 0.014 |

¹A mixture of rice, vegetables, and lentils cooked with spices

conducted with the separate sample of 20 schoolgirls. This exercise produced aggregate ratings of the girls' categorization of foods into "high iron," "low iron," or "no iron." Although the results suggest familiarity with iron as a food component, they should be viewed with some caution because of the many "I don't know" responses; for 11 of the 20 foods, at least 25% of respondents were unable to offer a rating. We summarize the results as follows:

- 1) Girls perceive correctly that some local foods that are "high in iron," including chicken liver and colcasia (a leafy green vegetable known locally as *pui shak*). They also correctly placed the commercial food items Horlicks and iron-fortified instant noodles in this group.
- 2) Girls commonly misclassified milk and fruits as iron rich, which they are not. Their consumption is promoted by BRAC for other nutritional reasons.
- 3) Girls underestimate the iron content of some highly accessible foods—especially small dried fish, and, to a lesser extent, amaranth (*lal shak*), bitter gourd, and ruti (wheat flatbread).

Schoolgirls have good exposure to basic messages about health and nutrition and clear views about their importance. To gauge exposure to nutrition information, we selected 5 sentinel messages from a review of BRAC program materials. As shown in **Table 5**, we found that exposure to the sentinel messages was generally high, and most of them are judged to be important. In short, the girls' responses on the "importance ratings exercise" show that they place a high value on "a balanced diet."

In contrast to their high ratings on the importance of the nutritional messages, schoolgirls are concerned that some messages may not be feasible (actionable) because of household economic constraints. For the feasibility ratings, as for the importance ratings, we asked respondents to rate each item generally for "girls of your age," rather

TABLE 4 Comparison of perceived and actual iron content of local foods¹

| Perceived iron content, n = 20 | Actual iron content, mg Fe/100 g | | |
|--------------------------------|---|--|--|
| | High >3.0 | Moderate 3.0–1.0 | Low <1.0 |
| High | Mother's Horlicks 50.7 Chicken liver 9.0 Colcasia leaves 4.9 Instant noodles 4.5 | Egg 1.7 Chicken 1.0 Indian spinach 2.2 | Apple 0.1 Cows' milk 0.1 |
| Moderate | Amaranthus leaves 8.5 | Duck meat 2.4 Beef 2.2 | Pumpkin 0.7 Rice 0.3 Large fish 0.35 |
| Low | Dried small fish 6.7 | Bitter gourd 2.9 Ruti (flatbread) 2.7 | Mashed potato 0.6 Yellow mango 0.3 |

¹All iron values are from the Food Composition Table for Bangladesh (Institute of Nutrition and Food Science, Center for Advanced Research in Sciences, University of Dhaka, 2013), except for Horlicks and instant noodles, which were recorded from the product packaging.

than for the individual respondent personally. Although the importance of messages was seen as applying to everyone, many respondents gave lower ratings on feasibility because they were concerned that not all girls are in a position to follow the messages, particularly those related to iron.

Sources of knowledge

The acquisition of biomedical nutrition and health information involves multiple channels, of which family and school education activities are the primary sources. The schoolgirls in our sample were not the direct recipients of BRAC programming. Only 17% of our respondents could recall having ever talked with a BRAC community volunteer—*shastya sebika*—for information of any sort. Also, BRAC adolescent clubs that function in some areas of Bangladesh were not a feature in the study area. Girls acquire nutrition and health information from many sources, including teachers and mothers, as well as indirectly from media and sources that originate with BRAC. It appears that there is a significant convergence of beliefs and knowledge conveyed to girls by family

members (usually mothers), by teachers, and by books (which play a role not only in the school but in the home environment).

Food beliefs and behaviors related to iron

Anemia and behavior.

Traditionally, girls are expected to reduce or eliminate consumption of certain foods—including fish—during menstruation. More than a third of the girls in our sample said that they restrict their consumption of specific foods during menstruation. The most commonly reported food avoidance is “sour” foods, which are undesirable because they are believed to increase menstrual bleeding by thinning or diluting the blood, thus prolonging menses. The following quote illustrates this idea:

“Sour foods destroy the blood in the body. If someone eats sour in the time of menstruation it causes more bleeding, so that we should avoid foods of this type during this time” (respondent #020).

Less common, but of more concern, is the cultural proscription of fish consumption during menstruation, including the small dried

TABLE 5 Sentinel messages: exposure, importance, and feasibility

| Sentinel messages | Exposure, n = 23 n (%) | Importance rating | | | Feasibility rating | | |
|---|---------------------------|-------------------------|-----------------------------|------------------------|------------------------|----------------------------|-----------------------|
| | | Very important n (%) | A little important n (%) | Not important n (%) | Very feasible n (%) | A little feasible n (%) | Not feasible n (%) |
| “Girls of your age should eat a balanced diet” | 21 (91) | 25 (83) | 4 (13) | 1 (3) | 19 (63) | 10 (33) | 1 (3) |
| “Girls of your age should eat iron-rich foods to prevent anaemia” | 18 (78) | 19 (63) | 11 (37) | 0 (0) | 10 (33) | 19 (63) | 1 (3) |
| “Girls of your age should increase the quantity of food they consume” | 17 (74) | 14 (47) | 13 (43) | 3 (10) | 17 (57) | 10 (33) | 3 (10) |
| “Girls your age should take iron and folic acid tablets regularly to prevent anaemia” | 11 (48) | 17 (57) | 11 (37) | 1 (3) | 11 (37) | 17 (57) | 2 (7) |
| “Girls of your age should wash their hands whenever they come from the toilet or from outside the home” | 23 (100) | 23 (100) | 0 (0) | 0 (0) | 27 (90) | 3 (10) | 0 (0) |

TABLE 6 Responses to the question: "What are all the actions that you do to order to protect your health?" (n = 23)

| Items | Responses (%) | Average rank | Salience |
|-----------------------------|---------------|--------------|----------|
| "Maintain personal hygiene" | 19 (83) | 2.26 | 0.557 |
| "Exercise" | 11 (48) | 1.82 | 0.377 |
| "Eat regularly" | 10 (44) | 2.5 | 0.243 |
| "Eat nutritious food" | 8 (35) | 1.88 | 0.269 |
| "Work around home" | 7 (30) | 2.71 | 0.2 |
| "Walking" | 6 (26) | 2 | 0.172 |
| "Sleep regularly" | 5 (22) | 2.8 | 0.115 |
| "Drink enough water" | 3 (13) | 4 | 0.048 |
| "Play games" | 3 (13) | 2.67 | 0.087 |
| "Take rest regularly" | 2 (9) | 4 | 0.035 |
| "Avoid hard work" | 2 (9) | 3.5 | 0.043 |
| "Read story book" | 1 (4) | 5 | 0.019 |
| "Consult with doctor" | 1 (4) | 3 | 0.014 |

fish that are widely used to flavor local dishes. Two-thirds of the girls spontaneously reported knowledge about the existence of this proscription and 26% of the girls reported that they reduce or eliminate fish during menstruation, many of them because they believe it gives their menses a disagreeable odor. This idea is illustrated in the two following quotes:

"If we eat fish [during menstruation] a bad smell comes from our body. The menstrual blood gets a bad smell." (respondent #005).

"I eat only a little fish when I'm menstruating ... I get a foul smell if I eat fish during menstruation." (respondent #012).

On the other hand, it is important to note that 39% of respondents said that, although they were aware of this advice, they choose to ignore it.

Cultural values

In this section, we present the results of our analysis of the cultural values that emerged from the in-depth interviews. By "cultural values" we refer to the underlying concepts that are shared within members of a group and which have an emotional component (19). Underlying values are often not directly articulated by respondents but are derived from text analysis results and supported by reported behaviors.

Adolescent girls have a conception of health that includes, but is not centered on, ideas about food and nutrition. In fact, food and nutrition are not uppermost in girls' minds when they reflect on their health requirements, as shown in Table 6. Although regularity of meals and the nutritional quality of food were cited by a sizable minority of girls (44% and 35%, respectively), we see that personal hygiene and exercise were both more salient health-maintenance actions. From follow-up questions to explore the meaning of "hygiene," we found it included washing their clothes, cutting their nails, brushing their teeth, and bathing regularly. The list also suggests that fulfilling domestic obligations through the performance of light housework is an important aspect of their larger concept of "health."

Dieting to lose or maintain weight has entered Bangladesh "schoolgirl" culture.

The girls in the school-going sample are familiar with the practice of dieting. Although only 13% of the respondents said that they had themselves engaged in dieting to lose weight, 65% said that someone

in their social circle practices this. This finding indicates that norms of appropriate weight and the desire to achieve them are part of the culture, and hence part of food-related behavior in this rural district. This finding is consistent with the results of the message rating exercise in which the statement "girls of your age should increase the quantity of food they consume" received the lowest number of "very important" ratings of the 5 sentinel messages (47%).

In discussions about dieting, the most commonly mentioned food was rice, which may be reduced, eliminated entirely from the diet, or substituted with another staple. However, other foods may also be eliminated. Of note in the following quote is avoiding animal-source foods as well as the source of advice:

Interviewer: "Are there any foods you avoid in order to lose weight?"

Respondent: "Yes."

Interviewer: "Which foods are these?"

Respondent: "Meat, fish, and eggs."

Interviewer: "Did someone suggest that you avoid these?"

Respondent: "My father."

Interviewer: "What did he say?"

Respondent: "He told me to eat *ruti* [wheat flatbread] in the morning and night to lose weight."

Interviewer: "Do your friends also diet?"

Respondent: "Some of them."

Interviewer: "What do they do?"

Respondent: "They eat rice one or two times a day instead of three."

Fathers have a special connection to snacking. We found persuasive evidence that consumption of snacks by adolescent girls is more closely tied to fathers than to mothers. The results of the rating exercise (phase III) showed that fathers were far more likely to be the source of snacks or money for snacks than other family members or friends. For example, 14 respondents said that their father was "very likely" to give them money to buy snacks, and another 5 said he was "somewhat likely," whereas 10 girls rated their mother's participation in paying for snacks as "somewhat likely," whereas only 2 reported that getting money from their mother was "very likely."

Most girls are involved in preparing meals, giving them an emotional stake in family diet and a degree of agency over what they consume. As many a 70% of our main sample of 23 girls had played an active role in meal preparation during the previous 24 h, which included participating in the preparation of foods that are cooked by someone else in the household, typically the mother, but sometimes an aunt or sister. In some cases, respondents reported both preparation and cooking. Girls described with ease the ingredients that make up specific dishes and—unprompted—often expressed their own likes and dislikes about specific foods, suggesting a degree of agency in what they consume.

Discussion

Beginning with the school environment, the findings related to eating at school are important for several reasons. First, we see that school-going girls have a problem with scheduling eating when there is no school lunch or designated lunch room. Addressing this problem would

involve activities to change school policies and infrastructure in order to expand opportunities for girls to consume healthy foods during the day. In the absence of a school meal program, a 2-pronged approach could be explored that involves: 1) the establishment of a space and a schedule routine for eating at school, and 2) creating greater awareness in families about the value of packing a healthy meal for students. Additionally, feelings about the risk of “mess” from transporting food from home also bear consideration, given the emphasis that girls place on personal cleanliness and hygiene in their conception of health.

The data on snacking highlight another important feature of schoolgirls’ diets. They reveal a fundamental cultural dynamic, namely the role of fathers as the source of snacks and funds for girls to purchase snacks. Although this practice undoubtedly reflects the control and flow of money within households (from male household heads to women), it also represents an area of bonding between fathers and daughters. Efforts to improve the nutritional quality of girls’ food intake in school settings must take care that these efforts do not disrupt the bond that the present “snacking culture” reinforces. In this regard, the situation is reminiscent of a dilemma that has surfaced commonly with respect to improving breastfeeding and complementary feeding practices, namely that in many cultures men are shut out of an important social bond when their role in purchasing formula and baby bottles to feed infants or supplying infants and young children with inappropriate early complementary foods surfaced as a barrier for improved infant and young child feeding practices (20). The finding about the significance of fathers in relation to snacking offers opportunities for increasing their involvement in their daughters’ nutrition.

The current snacking pattern offers opportunities to create healthier snacks that fulfill the need for food in the many hours girls experience between eating opportunities at home on schooldays. In addition to cost, attention to developing snacks that are not excessively high in calories is important given the value of preventing obesity in adolescent populations worldwide (21, 22). It also offers an opportunity that could potentially contribute to preventing iron deficiency.

The finding that one-fourth of the girls report that they avoid fish during menstruation is important. It highlights the fact that menstruation management is problematic for many school girls. If the practice of not eating fish when they are menstruating is widespread, it may be contributing to lower iron status in Bangladeshi girls, whether they are in school or out of school. Further investigation of its ubiquity, coupled with nutrition messages to address this misperception, is clearly indicated. However, another feature of this specific finding concerning cultural knowledge is that it points to the need to address the larger problems around menstruation and menstrual hygiene that need to be followed up by intervention programs (23).

Shifting focus to the issue of cultural “beliefs” compared with “knowledge,” we suggest that this matter goes beyond academic semantics. In our view, all scientifically generated nutrition and health-related cognitive content, like all the other cognitive content people carry in their minds, should not be classified as either “beliefs” or “knowledge” based on the origin of the content (18). “Ideas” that originate in biomedical sciences, as contrasted with ideas whose origins are in other aspects of culture and experience, should not be regarded as “true knowledge,” with all other knowledge being seen as “beliefs,” or worse yet, “superstitions.” This false dichotomy sets up a potentially negative relation between BCC providers (including teachers, health

workers, and other agents of social change) and the recipients of messages. Privileging biomedical “beliefs” over traditional cultural beliefs changes the relation between communicator and recipient, and inevitably implies superiority of the communicator and a denigration of received wisdom. This is not to say that all beliefs are appropriate with respect to contemporary understanding of the principles of good nutrition and health. For example, in the case of avoiding animal-source foods during menstruation, this idea is incorrect for healthy nutrition. Replacing this specific piece of cultural knowledge with knowledge that is supportive of good health should be part of nutrition BCC efforts in rural Bangladesh, not only directed to girls, but to the families in which they live. It is a matter of how one addresses the issue as well as a commitment to sustaining respect for the complexity of local culture.

We interpret the results showing the doubts expressed by respondents about the feasibility that all girls are in a position to implement sentinel messages as reflecting the girls’ well-developed consciousness about the effects of poverty in their community and a concern for the well-being of others. The theme of well-being of others also surfaced in the girls’ discussions about participating in household activities, particularly of helping their mothers with the management of household chores. Although they did not explicitly articulate concepts of a “healthy state of the household” or a “healthy state of their community,” the discussions indicate the social nature of health, as conceived by school-going adolescent girls in the district. This finding extends beyond an academic interest in adolescent culture. It has important implications for activities to integrate nutrition across BRAC programs. In particular, it points to the potential of recruiting adolescents into both community and school outreach activities (e.g., in street theater) to provide information on acquiring and maintaining healthy dietary practices and overcoming barriers to achieve them. This would have several benefits: expanding BRACs resources to reach community members, providing adolescent girls with meaningful opportunities to engage in social actions, and reinforcing girls’ nutrition and health knowledge.

With the growing concern about obesity prevention in low- and middle-income countries, the finding that most girls have friends or acquaintances who engage in dieting is both a warning and an opportunity for BRAC nutrition activities. From the perspectives of both public health and social well-being, preventing overweight is far preferable to managing it after it has occurred. The results of the study suggest that identifying and implementing interventions to increase socially acceptable and culturally appropriate physical activity opportunities, as well as dietary obesity prevention strategies, into BRAC programming directed to adolescents are opportunities for increasing BRAC offerings to support adolescent health and nutrition.

Limitations

There are several methodologic challenges posed by small sample size. One problem is that it constrains our ability to examine intracultural diversity (24). This is a general problem in ethnographic research, in contrast to survey research and epidemiologic analyses where the evidence for intracultural diversity is essentially built. That is, results are presented as “central tendencies,” with mean values and SDs that automatically give one some feeling about intragroup diversity. Moreover, analyses that seek to understand the correlates of distributions provide insights into the nature of intrapopulation

differences and their implications. In qualitative studies with small samples, including the study presented here, there are no built-in safeguards against overgeneralizing. In our study, a close examination of the results provides clear evidence of the existence of intracultural diversity, including diversity in the depth and breadth of biomedical nutrition knowledge. The results of the interviews suggest that there are substantial differences among the girls in the depth of their understanding about scientific nutrition knowledge. In future studies, these and other differences need to be more fully examined and their implications for interventions assessed so that intracultural differences in the population the interventions are intended to benefit are adequately addressed in the planning and delivery of actions.

Small sample size, coupled with the decision not to ask respondents to estimate quantities of individual foods in the 24-h recall, preclude the possibility of characterizing nutrient intake of adolescent school girls or characterizing their diets from the perspective of nutritional adequacy. On the other hand, the nearly ubiquitous presence of animal-source foods in the girl's dietary records was a surprising finding that is unlikely to be explained by the small sample size.

The time-constrained circumstances of this study, coupled with the lack of availability of an appropriate census, meant that it was not practical to recruit respondents according to a random sampling frame. We relied on community workers to identify potential respondents and stressed to them the importance of selecting a diverse sample with respect to age, economic status, and geographic area (including distance from town centers). The sociodemographic data indicate that the sample is diverse, but we cannot rule out the possibility that the results are biased in favor of more knowledgeable respondents. Apart from the issue of representativeness of the sample for the district in our study, it is important to note that the results pertain to school-going girls in this district, and their applicability to nonschool-going adolescents or schoolgirls in other districts remains to be determined. This is particularly important to bear in mind in the Bangladesh environment, where a girl who marries when she is of school-going age will often leave school and relocate to her husband's family home, where her agency and her access to healthy foods may be altered.

Conclusions

We want to highlight the general implications of the findings:

- 1) The results of the study provide a starting point for BCC activities to reinforce and expand the level of general biomedical nutrition and health knowledge reflected in the interviews.
- 2) Providing confidence and support for girls' perceptions and addressing their misperceptions (e.g., concerning diet and menstruation) emerge as priorities for communication programmatic actions.
- 3) The results provide information about concepts and values that can be drawn on to structure messages, support their emotional components, and facilitate communication.
- 4) The results indicate the necessity of involving other key players, especially mothers, fathers, and other family members, as well as teachers and snack purveyors, in supporting and improving girls in rural Bangladesh contexts.

- 5) The findings provide an important warning to be sensitive to father-daughter and household dynamics in BCC and other programming efforts.
- 6) The results indicate that school-going girls are a potential resource for expanding knowledge about nutrition in the community.
- 7) The findings clearly show that, in addition to BCC efforts, there is a need to address infrastructure barriers that affect the nutrition of school-going girls.
- 8) The findings point to the potential of improving purchased snacks as a means to support girls' nutrition.

A full examination of the specific implications for integrating nutrition into BRAC programs requires an explication of the BRAC delivery system. This is described in Chowdhury et al. (25). Our conclusions in this paper are general recommendations for future programmatic actions rather than BRAC-specific recommendations.

In our view, the results of the study demonstrate the value of including ethnographic research in implementation research. The value of the approach resides particularly in facilitating the discovery of local, emic perspectives, and in revealing respondents' rationales for their perspectives and behaviors, as well as the behaviors themselves. They also provide a solid ground for designing follow-up studies with larger samples that will permit quantitative analysis to link adolescent girls' beliefs/knowledge to their behavior, as well as identifying the relations of these to modifiable social factors. Such studies will provide a firm ground for future interventions to overcome the barriers that limit school-going girls in low- and middle-income countries from achieving their health and nutrition goals.

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The authors' contributions were as follows—CSJ, GP, JPH, and JL: designed the research; MMB: conducted the research; JL: had primary responsibility for data analysis; JL, GP, JPH, and JC: were responsible for data interpretation, which was facilitated by two 3-d research meetings; JL and GP: wrote the paper, with input from JPH and JC; GP: had primary responsibility for final content; and all authors: read and approved the final manuscript.

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