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A 'snapshot' of physical activity and food habits among private school children in India

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Abstract

Concerns about increasing obesity in poorer parts of the world, including India, have often been premised in terms of global shifts in activity levels and caloric consumption. Lifestyle changes have been documented in large cities, but we do not know whether these changes are reaching young people in less urban locations. This study used photo journals to explore children's perceptions of their food and activity habits in a remote Indian city. Children expressed interest in active pastimes, learning, and health, and indicated traditional, modern, local, and global influences in their lives. Findings offer context for research and interventions.

Keywords

Children; India; nutrition transition; photovoice; physical activity

Introduction

Concerns about overweight and obesity are emerging in middle-income and lower-income countries, even as underweight continues to be a major health problem (Monteiro et al., 2004; Ravishankar, 2012). In India, 9.3% of boys and 7.9% of girls are overweight or obese at ages 8–11 years and 2.3% and 2.9%, respectively, at ages 15–18 years; at the same time, almost a quarter of children at these ages are underweight (Patel et al., 2015). Across age groups, overweight and obesity are more prevalent in urban than in rural places (Patel et al., 2015). Prevalence estimates of overweight among children aged 10–19 years have been calculated at 19.1% in metropolitan cities, 12.7% in other major cities, and 1.7% outside city limits (Jeemon et al., 2009). Prevalence of overweight and obesity may differ between socioeconomic groups, with reports as high as 35% among high socioeconomic status (SES) children in New Delhi (Gupta et al., 2011). Students at private schools, who typically come

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from wealthier families, are 4 times more likely to be overweight and 4–10 times more likely to be obese than those at government schools (Misra et al., 2011).

Researchers have argued that changing activity and food consumption patterns are major factors underlying the emergence of obesity in middle-income and lower-income countries (Popkin et al., 2012). Refined carbohydrates, sugar, animal-sourced foods, and edible oils, often packaged into processed foods, have become increasingly common in recent decades. Popkin and colleagues linked this nutrition transition to economic, technological, and social changes. At the same time, the transition to industrialized economies and expanding access to technology may be making many leisure, occupational, household, and transportation activities more sedentary (Gupta et al., 2012; Kiranmala et al., 2013). Behavior changes may also reflect changing preferences influenced by access to new goods and ideas through global markets and mass media (Sullivan et al., 2011; Verma and Sharma, 2003).

To understand the lives of children in this changing context and implications for children's wellbeing, we take a child-centered approach to understanding the nutrition transition. We used photo journals to learn from children about their perceptions of their food and activity habits in a remote Indian city, where globalization is just beginning to reach. We focus on children's agency and perceptions about their lifestyles, the foods and activities that are important to them, and how they interpret their own decision-making around these factors.

Background

Lifestyle changes concomitant with globalization, economic development, and access to technology are often implicated in concerns about the emergence of obesity and chronic diseases in India. New behaviors, such as eating processed foods and eating out, have been associated with obesity among children aged 5–19 years (Chopra et al., 2013; Goyal et al., 2010; Gupta et al., 2012; Laxmaiah et al., 2007). Families are increasingly able to purchase televisions, computers, and gaming systems, and children spend leisure time in sedentary activities indoors (Raj and Kumar, 2010). Emphasis on education also affects engagement in physical activity, as children spend much of their time studying (Verma and Sharma, 2003). At the same time, changes related to globalization, economic development, and technology have contributed to major improvements in health (Dollar, 2001; Hawkes et al., 2007). For instance, changes in food production and prices increase availability of energy-rich foods, addressing India's persistent problem of underweight (Patel et al., 2015).

The literature on the nutrition transition has focused on the impact of the food and built environments on children's health, but it is also important to consider children as social actors who affect the contexts within which they live and choose from the options available in those contexts (Balagopalan, 2011; Mason and Hood, 2011). Children have agency to interact with, influence, and interpret their environment. They have unique experiences and insights, which are sometimes unfamiliar to adults (Mason and Hood, 2011; Mmari et al., 2014). Based on focus groups and interviews with children in New Delhi and Bangalore, researchers found that middle- and high-income urban children were knowledgeable about healthy and unhealthy foods, but their consumption did not reflect preference for healthy foods (Riggs et al., 2013; Swaminathan et al., 2009). Studies on the nutrition transition in

India have rarely followed a child-centered approach. The few studies about children's experiences have focused on large cities.

In this study, we used photovoice, a participatory research method that allows participants to talk about their lives and show what is important to them through photography and short narratives (Findholt et al., 2011; Mahmood et al., 2012). The method utilizes participants' knowledge of their community to identify concerns and opportunities for intervention that researchers might otherwise overlook. Prior studies demonstrated its feasibility for work with youth and in developing settings (Hergenrather et al., 2009; Palibroda et al., 2009). Researchers have involved children in photovoice projects to gain a better understanding of play experiences in Tanzania, physical activity participation among Vietnamese refugees in the United States, and food choices among African American girls (Berinstein and Magalhaes, 2009; Bibeau et al., 2012; Rotich, 2014). Photovoice has informed the development of tobacco, drug, and alcohol use prevention curricula for youth in South Africa and provided content for reports to pediatric hospital administrators in the United Kingdom (Pfister et al., 2014; Wang, 2006). Understanding the nutrition transition in India is a new application of this method. By exploring what children perceive to be important activities and consumption goods, this study offers a new perspective on the course of India's nutrition transition and its implications for children's health.

Setting

This study was conducted in Vijayapura, India, a remote, mid-sized city with a population of 326,000 in the southern state of Karnataka (Registrar General and Census Commissioner, 2011). Vijayapura is a Tier III city (official classification for the smallest, least developed urban centers in India) undergoing economic, social, and cultural changes as new job opportunities and products become available through global markets. It is an emerging regional leader in higher education and economic development, with literacy rates higher than the national average (Census Organization of India, 2011). Among students aged 13–16 years in Vijayapura, 69% are normal weight relative to international standards[1] and 7% are overweight or obese; overweight and obesity are more prevalent among girls than boys and among private than government school students (authors' calculations). Median monthly income of families with school-going children is INR5001–10,000 (US$79–159, as of June 2015) for government school students and INR10,001–20,000 (US$158–317) for private school students. The majority of households follow the Hindu religion (72%). This study focuses on children attending private schools in Vijayapura, as new technologies and lifestyle changes often reach wealthy families first, and the prevalence of overweight and obesity tends to be higher among wealthier families.

[1]Note
World Health Organization (WHO) growth reference for school-aged children (5–19 years): based on sex-specific body mass index (BMI)-for-age z-scores, children are categorized as underweight (<2 standard deviation [SD]), overweight (>1SD), and obese (>2SD) (de Onis and Lobstein, 2010).

Data and methods

This study is a component of a larger research project on gender, family environment, and unhealthy weight being conducted in Vijayapura since 2012 by the second (S.A.C.) and last author (S.S.P.). The project was conducted with institutional ethical committee approval from BLDE University's Shri B. M. Patil Medical College. For the photo journal project, teachers at three private schools involved in the larger study invited eighth and ninth grade students to participate. In July 2013, they identified 15 boys and 15 girls aged 12–14 years whom they deemed to be able to communicate in English and likely to complete the project. Information about the study was sent home with students, and written consent from parents and assent from children were obtained. Each participant was given a Kodak disposable camera and a notebook. Interviewers explained for 15–20 minutes the purpose of the study and how to use the cameras using both English and the local language, Kannada. In advance, the team had prepared detailed instructions for participants on taking photographs and writing in their journals. The instrument was tested with two children from one private school to ensure the clarity of the instructions and to make the questions locally appropriate. Participants had 4 days to complete the project.

The journal consisted of three prompts about participants' experiences with food and activity. For each photograph they took, participants were asked to enter the number of the photograph (displayed on the camera), date and time, and a brief description. Prompt 1 instructed participants to take 5–10 photographs showing "what activities you like to do. These photographs can include pictures of places where you like to play or what you use to play." They were asked to give the name and location of the activity and to discuss: "How often do you do this? Who do you do this with? Why do you do this?" Prompt 2 instructed participants to take 4–8 photographs of "common food items used for cooking that are available in your house today." They were asked to describe why they took the photograph and to discuss: "Who bought this? Do you like this? How often is this used?" Prompt 3 instructed participants to take 4–8 photographs of "food/drinks that you would like to eat right now." They were asked to describe why they took the photo and to respond to the questions: "Who buys this? Where does this come from? Who do you eat this with? How often do you eat this?"

Once the cameras were collected from participants, the study team developed the film and kept all materials in a secure location. The third author (S.T.) did a first reading of the journal entries, entered the journal data into the MAXQDA software package, and ran word frequencies using MAXDictio (VERBI GmbH, 1989–2014). Preliminary coding of the journal data and frequently re-occurring words identified topical areas and themes to be explored during subsequent analyses. The first author (E.M.S.) then coded the combined photographs and journal entries, adding and revising categories as needed. Coding was done manually to capture the nuances in the photo journals and to accommodate for the fact that participants were not writing in their native language.

Results

A total of 30 private school students aged 12–14 years participated in this study: 11 girls and 7 boys in eighth grade and 4 girls and 8 boys in ninth grade. All 30 participants returned the cameras and made at least some journal entries. In total, respondents provided 482 journal entries: 219 for prompt 1 (“activities you like to do”), 169 for prompt 2 (“common food items available in your house”), and 94 for prompt 3 (“food/drinks you would like”); 407 photographs could be developed. After matching photographs to descriptions, 44 photographs did not have corresponding descriptions and 119 journal entries were missing photographs. We did not include photographs without descriptions in analyses to avoid misinterpreting their meaning; if descriptions without photographs were sufficiently detailed to provide information, they were included. Two entries for prompt 1 and two for prompt 2 were indecipherable and were excluded.

Activities

The first prompt asked participants to describe activities they like to do. Children most frequently described sports and playing outside (76 entries). The next most frequently mentioned activities that children liked were related to school (40 entries) and technology (34 entries). The remaining entries described reading, home and family interactions, chores, transportation, spirituality, and sedentary pastimes. Most activities took place at home (143 entries) and fewer at school (37 entries) or in the community (31 entries). Indoor activities were more common than outdoor activities (123 vs 88 entries). Boys and girls contributed equally to these entries, which are summarized in Table 1.

Physical activity—Active pastimes were popular with the children. More than one-third of entries about activities children liked to do referred to sports, exercise, dance, or playing outside (Figure 1). A total of 25 of 30 participants described at least one physical activity that they liked to do. Active pastimes were described as a daily or regular occurrence more often than any other type of activity. Participants took part in physical activity at home, in the neighborhood, and at school. Describing a picture of her schoolyard, a ninth grade girl wrote, “We can play many things in ground. By this we can feel healthy. Playing is needed for students. It helps students improve their skills.”

Participants indicated that they took part in physical activities for pleasure and exercise. Some described how much they enjoyed their favorite sports. An eighth grade girl stated, “I have basketball net in my house … I have taken this photo because I like basketball and I go to level in basketball.” An eighth grade boy wrote, “I play cricket daily. I love to play cricket with my friends and brother,” and a ninth grade boy said, “I want to play volley ball because it is an interesting game. I will play for fun and it will give me happiness while playing.” Some mentioned that playing sports improved their health and bodies. A ninth grade boy wrote about soccer, “Football is very popular game in the whole world it is good for your leg hands health and we should become fast.” An eighth grade girl mentioned that she played volleyball daily because “playing volleyball will help in growth.” In reference to skipping rope, a ninth grade boy wrote, “This is intensive physical exercise helps in strengthening of our bones and height.”

Participants also described being active while doing housework and getting around. About half of participants reported doing chores at home, such as sweeping or washing dishes. These activities were reported mostly by girls, in concordance with local gender roles. A total of 15 participants mentioned riding bicycles and described the benefits bicycles offer for transportation, health, and fun. An eighth grade boy wrote, “I like my cycle because I can ride my cycle anywhere and it is helpful to my exercise,” and a ninth grade boy said, “Everyday in the evening me and my friends go for bicycle riding as it’s a good physical and recreation activity.” A ninth grade girl noted that by cycling, “Our leg bones will become strong and healthy.” A ninth grade boy asserted, “Cycle is very important in modern life. [Motor]bike is not good.”

Sedentary pastimes—Children described more sedentary activities they liked to do than physically active ones. About half of the entries referred to stationary activities inside their homes, like reading, doing homework, watching television, using the computer, or playing board games. Photographs also showed participants sitting in school and on the bus. Five participants described riding motorbikes on their own or with their families.

Children described school, homework, and reading as daily or frequent activities (Figure 2). When respondents noted the duration of activities, the lengthiest activities almost always were studying or reading, at 2–4 hours. Some mentioned receiving extra tutoring or wanting to “score good marks” (ninth grade girl) or “get higher rank in school” (ninth grade boy). One ninth grade girl summed up the importance of school, saying, “We should study regularly to improve our knowledge daily we should do our homework and we will get perfect job.”

This emphasis on knowledge extended to sedentary activities beyond schoolwork. An eighth grade boy took a photo of a board game and wrote, “I’ll play this daily by which I’ll get knowledge of banking.” Another eighth grade boy collected coins “to see national symbol of country and famous personalities on the coin.” Some children read books or newspapers to “get information all around the world” (eighth grade boy). Participants described television as both “a mode of entertainment and knowledge source” (ninth grade girl) that provided information not given in books. An eighth grade girl said, “This is the news channel I usually watch … at night after or while having dinner. By seeing this news channel I feel I learn something about my country and I am learning to speak English better.” Computers helped participants learn the “latest information through internet” and get “to know about different countries” (ninth grade girl).

About two-thirds of participants mentioned using technology at home or school, including television, the Internet, computer games, video games, and cell phones. Gender differences in technology use were apparent. Whereas 13 of 15 boys described technology-related activities, only 6 of 15 girls did. Specifically, technology use for entertainment was more common among boys than girls, but girls just as often as boys described using technology as a source of information. A total of 13 participants said they liked watching television, but only four noted that they watch daily or regularly. Participants described spending longer amounts of time on sports, reading, and studying than on technology.

A motivation for participating in many sedentary activities was fun or enjoyment. A ninth grade boy wrote, “My habit is to play the computer games and hearing songs in computer for 1/2 an hour. I play games for fun and time pass.” Similarly, an eighth grade boy said he played computer games “for entertainment and fun and also for rest.” Relaxation was a benefit assigned to sedentary activities. A ninth grade girl said that she felt relaxed when playing chess with her father, and a ninth grade boy even described watching television as “a physical activity [because] from seeing T.V. our mind will be refresh when we are in tension.” Nevertheless, two eighth grade girls mentioned that although they enjoy playing with the games and toys they photographed, they “get little time to play.”

Food and eating

The second journal prompt asked participants about common food items available in their homes, and the third journal prompt asked about food and drink items they would like to have now. We analyzed responses about food together because respondents did not differentiate between foods that were available in their homes and food they would like to eat, and both categories included photographs taken inside and outside the home, showed raw ingredients and prepared dishes, and referred to a variety of motivations for eating the foods. Boys and girls contributed equally to these entries.

As shown in Table 2, grains and carbohydrates that are the major starches in this area, especially rice, *roti*, and *chapatti*, were the most prominent food items in participants’ photo journals (93 items), featured almost twice as many times as other kinds of food. Next most frequently mentioned were vegetables (48 items). There was just one photo of chicken and no other mention of meat, as would be expected given the high prevalence of vegetarian diets in this population. The most popular beverages were milk and tea, which is typically served sweetened and with milk.

Children focused many of their journal entries on foods they liked. They cited taste or enjoyment as a reason for eating particular foods in 40% of entries, encompassing all categories. An eighth grade girl wrote, “I like milk and bread. So, I drink and eat morning and evening in other time also.” Benefits of nutrition or energy were mentioned in about 25% of entries. Participants discussed eating “nutritious food for keeping my health good” (eighth grade girl) and ensuring “diseases will not come” (ninth grade girl). The benefits participants noted were often specific and described a range of different foods. An eighth grade girl mentioned that almonds maintain cholesterol, and a ninth grade boy said “eating banana in the night helps for good digestion.” Rice gave one ninth grade boy energy to be “strong and healthy,” and another ninth grade boy referred to his usual dinner of *chapatti* (flatbread) and vegetables as “rich with fiber vitamins calcium and other micro nutrients which helps in our proper nourishment.” Diet was important not just for physical health, but also for “mind development” (ninth grade boy) and “energy [so] we can do work” (ninth grade girl).

Children also attributed nutritional value to sweets in a few entries. A ninth grade boy described cookies as “very healthy food because biscuits is only our stomach will full.” Describing his photo of a bag of sugar, an eighth grade boy wrote, “I clicked this picture because it is carbohydrate, calorie product sugar which gives me energy.” Participants rarely

described food as unhealthy or having negative effects. Two exceptions were one ninth grade boy who described Maggi, a brand of instant noodles, as “very bad to our health” and one ninth grade girl who acknowledged, “we will get lipid from the Kurkure,” a type of prepackaged crunchy, savory snack food; however, the first participant indicated that it was not he but his sister who liked Maggi, and the second noted that she only ate Kurkure sometimes “just to change my taste.”

Children described food as having significant meaning for family and community. Many participants mentioned eating foods on certain occasions, like *karachekai* (fried dumplings with sweet coconut filling) at festival time or *idli* (steamed rice cakes) as “our special Sunday breakfast” (eighth grade boy). Several participants described their favorite foods as traditional or well-known Indian fare. A ninth grade boy mentioned, “I like curd. India is famous for curd.” Food was typically eaten in the family context. Of the 209 entries that indicated a location, 82% were in the home. Participants did not specify where in their home they usually ate, but some photographs showed them eating while watching television. A few participants included photographs of a potluck meal at school, and a ninth grade boy took a photo of two classmates passing food, writing, “It is a photo in my class that we are sharing each other. It will help bound the friendship.”

Overall, journals portrayed participants’ diets as consisting primarily of traditionally local and home-made foods. Most photographs of meals included flatbreads like *roti* or *chapatti* with various chutneys (Figure 3). An eighth grade girl wrote, “This is what I call it is as Chapati (Indian bread). This a regular food home made,” and a ninth grade boy described “our usual dinner” as *chapatti*, pickle, and vegetables. A ninth grade boy described his favorite dish, *bisibelebath*, as “made up of the rice and dal. It is a staple food of east India.” Some of participants’ favorite snacks were typical locally made Indian dishes like *chooda* (savory snack mix) and *papad* (thin crisps made from seasoned dough).

Although the majority of foods available at home were raw ingredients and homemade meals, photographs taken at home also featured some prepackaged items like biscuits and cookies, sweets, soft drinks, and sweetened drink mixes. A ninth grade boy said, “We drink some pepsi, mirinda or rasna [types of soft drinks] in our home. We like it so much.” An eighth grade boy wrote, “My daily drinking is chocolate drink. I mix my powder in the milk and drink daily morning and evening it is very tasty.” Some participants mentioned eating “fast food,” which referred to packages of Chinese-style noodles that could be prepared quickly at home; one eighth grade girl stated that she prepared these noodles for herself.

Nine entries referred to sweets from bakeries or shops, including cakes, pastries, chocolates, and ice cream. Another nine entries described snack foods from shops, hotels, and street stalls, including chips, puffs, and *panipuri* (fried dough filled with potatoes, chickpeas, and spiced water). These food items were typically portrayed as occasional treats rather than regular fare. Aside from one ninth grade boy who said that he ate chips or chocolates from a shop two to three times per week, participants generally reported that they had food from outside the home once per week or less. As an eighth grade girl wrote, “I have [this] when I am bored of the food which is prepared inside the home. It comes from a hotel. … I eat this twice in a month. And whenever guest or relatives comes.”

None of the children mentioned purchasing food themselves; they described, as is generally the norm in this area, that fathers purchased food and mothers cooked. The journals indicated that participants brought the food they ate at school from home. Although children did not directly control food availability in their homes, they expressed preferences and opinions about what their families ate. An eighth grade girl wrote, “I took this photo because I like these seeds very much. I tell to my mother to make these pulses bhaji very much.”

Discussion

With increasing concerns around the emergence of chronic disease in poorer countries as they enter global markets (Gupta et al., 2012; Hallal et al., 2012), a clearer understanding of activity levels and food consumption patterns in these settings is needed (Swaminathan et al., 2009). In this study, we took a child-centered approach to exploring diet and activity patterns in a remote mid-sized city in India. Photo journals conveyed children’s interests in active pastimes, learning, and self-improvement; positive attitudes toward food and their bodies; and a combination of traditional, modern, local, and global influences in their lives.

It has been suggested that economic changes and globalization have increased Indian children’s reliance on technology and interest in sedentary pursuits and that inadequate activity is contributing to rising obesity, particularly among affluent children (Kiranmala et al., 2013; Kotian et al., 2010). However, children in our study, who attended private school and were from relatively high-status families, indicated that being active was important to them. The vast majority mentioned some kind of active pastime in their photo journals; in fact, active pastimes were the most popular leisure-time activities, featured more often than all other types of recreation combined. In addition to finding active pastimes enjoyable, children expressed an interest in the health benefits of exercise and highlighted the role of physical activity in making them fast, tall, and strong. Whether their motivation was a sincere interest in health or a desire to portray a healthy lifestyle to researchers interested in health matters, this belief in the value of physical activity for promoting health is an important foundation for obesity prevention (Hakeem et al., 2001).

Self-improvement and achievement were prominent themes in children’s journals. Asked to document activities they like to do, many children took pictures of class and homework and expressed a desire to perform well in school. They also dedicated some of their leisure time to improving their knowledge and skills, for example, reading, watching the news, practicing art, or playing challenging board games. Some researchers have suggested that growing emphasis on education in India has increased children’s sedentary time, particularly among private school students (Verma and Sharma, 2003). Although active pastimes were the most popular form of recreation, when both school and leisure time were considered, the majority of activities included in the journals were sedentary.

Prior work has suggested that gender roles may guide activity levels of Indian children. In particular, girls spend more time on household work and less time playing outside or participating in sports than boys (Chopra et al., 2013; Gupta et al., 2012). We found that more girls than boys discussed chores, but boys and girls discussed similar active pastimes. Both boys and girls showed an interest in sports and outdoor play, although the photo

journals do not allow us to compare the time spent on these activities. We also found a gender difference in frequency and motivations for technology use; similarly, researchers in Turkey found that boys reported more screen time than girls (Karaca et al., 2011).

Notable in the photo journals was children's overall positive attitude toward food. Foods often had special meaning for children associated with events, traditions, and spending time with family and friends. Food items from nearly every food group were described as enjoyable and nutritious. While children referred to nutrition, they did not connect food to concerns about appearance or weight management. Instead, children highlighted health benefits or the energy food gave them to accomplish tasks. Rarely did they mention not liking a certain food or label a particular item as bad for one's health. The journals demonstrate children's interest in health and nutrition; the information children reported was sometimes accurate, sometimes not.

It has been suggested that developing countries are undergoing a nutrition transition away from traditional fare toward processed and prepackaged foods (Mendez and Popkin, 2004; Vepa, 2004). We found that both traditional and packaged food items were commonly available in children's homes; although children enjoyed processed items like white bread, chips, and sweetened beverages, traditional home-made foods were featured more prominently. Based on the photo journals, children ate food from outside the home only occasionally. Children indicated that parents largely determined food availability: children did not discuss purchasing food, although a few mentioned preparing convenience food items for themselves or asking their mothers to make particular foods.

Limitations and context

Participatory research using photography has been recommended as one method for reducing the power imbalance between researchers and children and giving children greater voice (Wickenden and Kembhavi-Tam, 2014). Many have emphasized children's right to speak about their own lives but urge caution in interpreting participatory research as inherently authentic or generalizable (Balagopalan, 2011; Wickenden and Kembhavi-Tam, 2014).

Photo journals proved to be an acceptable and feasible method to use with children aged 12 to 14 years in this developing area. Still, the method did present some challenges. Children received training for the project in both English and their native language, but the prompts were written in English and respondents were asked to complete the journals in English. Private school children in Vijayapura generally have good knowledge of English, but participants' ability to express themselves was probably limited. Selection by teachers of students who could complete the journals may have tilted the sample toward more successful, connected, or obedient students. Participants were likely aware of the researchers' interest in health matters, so they may have selected to respond in ways that reflect their knowledge of health and portray them as health-conscious individuals. Our analysis is restricted to the objects participants photographed during the 4 days they had the cameras, so it does not provide a full or representative portrait of their activities or diets.

To accommodate a short timeframe for data collection, we limited the sample to 30 students and used modified photovoice procedures. Whereas some studies use participant-developed prompts, our approach followed studies in which researchers develop prompts based on findings from their other ongoing research in the same population (Drew et al., 2010). While some photovoice projects span several weeks or months with participants meeting regularly to discuss their photographs, we adopted the strategy of collecting participants' reflections on their photographs through written narratives, as done in other projects (Baker and Wang, 2006; Hergenrather et al., 2009). This approach ensured that all participants could share their perspectives within a limited amount of time but precluded children's involvement in data analysis. Even with these modifications, the combination of photographs and written descriptions offered more candid representations of children's ideas, preferences, and habits than are collected through many other methods. Photo journals provided the children's interpretations of their lives and complement data collected through survey methods.

Childhood experiences vary considerably across India with factors such as religion, caste and class, gender, and location (Balagopalan, 2011; Nieuwenhuys, 2009). Our sample was not designed to be representative of Indian children; we collected data in one city and included only private school students, who are typically from wealthier families, more connected to global markets, and at higher risk of overweight than other children (Misra et al., 2011; Swaminathan and Vaz, 2013). These children may have more varied foods available at home, more access to technology, and higher academic expectations than poorer children. Future research should explore and compare the perspectives and experiences of children from different backgrounds.

Implications for future research and practice

As children indicated that they enjoyed active recreation, future studies should explicitly explore barriers that prevent children from engaging in physical activities as frequently as they would like. In particular, research is needed to examine whether girls' domestic obligations take away from time they would like to spend on active leisure. Studies measuring children's time use will also be helpful for exploring the role of school responsibilities in limiting physical activity. Given the focus on education and achievement among private school Indian children, programs to promote physical activity should emphasize for students, parents, and teachers that being physically active promotes academic success (Bezold et al., 2014; Castelli et al., 2014; Chen et al., 2013; Correa-Burrows et al., 2014; So, 2012). Children took photos of both academic and play activities at school, indicating schools might serve as a convenient site to increase physical activity in tandem with academic achievement (Ardoy et al., 2014).

About two-thirds of participants in this study mentioned using technology at home or school, for entertainment or education. They did not, however, indicate that screen time comprised a large portion of their day. Still, screen time is a priority area for future research and practice because patterns of technology use may be rapidly changing in developing settings like Vijayapura, and time spent watching television is one of the most robustly associated activities with childhood obesity in India and elsewhere (Kuriyan et al., 2007).

In their photo journals, children showed an interest in health and nutrition, but the information they reported about food was not always accurate. Similarly, a previous study of Indian children's perceptions of healthy eating found that although students of higher SES have some knowledge about nutrition and food choices, this knowledge does not correspond to healthy eating (Swaminathan et al., 2009). Programs could aim to increase children's knowledge about healthy eating without altering their positive perspective, as adopting unhealthy weight control efforts can contribute to poor body image, disordered eating, and weight gain (Neumark-Sztainer et al., 2006). For the children in this study, parents largely controlled food availability. Other Indian children have cited parents, grandparents, schools, and the media as influential in their eating and physical activity habits and important for health promotion efforts (Riggs et al., 2013). Thus, efforts to promote healthy eating should involve the whole family.

Conclusion

Photovoice engages children's creativity and unique perspectives to supplement data collected through standard research methods (Johnson et al., 2012; Wang, 2006). Photos and narratives are powerful tools for understanding experiences more fully, identifying values and needs, and developing interventions and learning materials tailored to a population (Pfister et al., 2014). In this study, children's photo journals offered insight into India's nutrition transition outside major urban centers, where most research has been conducted. Through their journals, children demonstrated interests in active pastimes, learning, and self-improvement; positive attitudes toward food and their bodies; and a combination of traditional, modern, local, and global influences in their lives. These themes provide context and direction for future research and interventions to promote health and wellbeing.

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Figure 1.
Eighth grade girl describes playing outside: “I play every Sunday in this garden. I like this garden very much.”

Figure 2.

Eighth grade boy discusses daily schoolwork: “I decided to take this photo because I sit and study on this daily. I sit on it daily and study alone to have proper table.”

Figure 3.

Ninth grade boy discusses family dinner: “I taken this photo while our family was doing dinner. These items were made by my mother. I surely I like these items were made in home. This is used often.”

Table 1

Activities in photo journals of Indian children.

Type	Entries	Examples
Active pastimes	76	Cricket, cycling, football, volleyball, basketball, skipping rope, exercising, dancing, and playing outside
School	40	Attending class, homework, and studying
Technology	34	Television, computer, cell phone, video games, and listening to music
Indoor activities	18	Board games, drawing, painting, and coin collecting
Reading	17	Reading not required for school: novels, newspapers, comics, and general knowledge/reference books
Chores	14	Sweeping, washing clothes, washing dishes, and tending plants
Family interactions	14	Entries about family members or home: mother cooking, baby sister playing, and rooms in house
Transportation	13	Bicycle, motor bike/scooter, and school van
Spirituality	8	Praying, worshipping, going to temple, and yoga
Inactivity	3	Just sitting and sleeping

Entries could be assigned to more than one activity type, so frequencies do not sum to 217.

Table 2

Foods in photo journals of Indian children.

Category	Items	Examples
Grains	93	Roti, chapatti, rice, bread, idli, and noodles
Vegetables	48	Onion, cauliflower, greens, tomato, potato, and okra
Snacks	30	Chooda, papad, panipuri, pakoda, kurkure, and puffs
Beverages	28	Tea, soft drinks, mango juice, lemonade, water, and coffee
Dairy	27	Milk, curd, and ghee
Sweets	27	Cookies, cake, karchikai, modaks, and chocolate drink mix
Fruit	25	Lemon, pomegranate, apple, orange, and banana
Legumes	17	Lentils, cashew, almond, groundnut, and sprouted seeds
Eggs	6	Boiled egg, omelets, and egg curry
Soup	6	Sambar and sar
Meat	1	Chicken