





# Conflicts between adolescents and their caregivers living in slums of Mumbai, India in relation to junk food consumption and physical activity

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## Abstract

**Objective:** To explore influences on the diet and physical activity of adolescents living in Mumbai slums, from the perspectives of adolescents and their caregivers.

**Design:** Three investigators from Mumbai conducted six focus group discussions.

**Setting:** The study was conducted in suburban Mumbai slums.

**Participants:** Thirty-six adolescents (aged 10–12 and 15–17 years) and twenty-three caregivers were recruited through convenience sampling.

**Results:** The findings highlighted the complex negotiations between adolescent and caregivers surrounding adolescent junk food consumption and physical activity opportunities. Caregivers learned recipes to prepare popular junk foods to encourage adolescents to eat more home-cooked, and less ‘outside’, food, yet adolescents still preferred to eat outside. To adolescents, the social aspect of eating junk food with friends was an important and enjoyable experience. Caregivers felt that they had no control over adolescents’ food choices, whereas adolescents felt their diets were dictated by their parents. Adolescents wanted to be physically active but were encouraged to focus on their academic studies instead. Gender was also a key driver of physical activity, with girls given less priority to use outside spaces due to cultural and religious factors, and parental fears for their safety.

**Conclusions:** These findings show that adolescents and caregivers have different agendas regarding adolescent diet. Adolescent girls have less opportunity for healthy exercise, and are more sedentary, than boys. Adolescents and caregivers need to be involved in designing effective interventions such as making space available for girls to be active, and smartphone games to encourage healthy eating or physical activity.

**Keywords**  
Adolescents  
Slum  
Diet  
Physical activity  
Qualitative study

Adolescence (10–19 years), a period of rapid transition<sup>(1)</sup>, bridges the gap between childhood and adulthood. Adolescent nutrition influences their own health as well as the nutrition and health of the next generation.

Adolescence is a critical period during which optimal nutrition could alleviate the effects of poor fetal and infant nutrition<sup>(2)</sup>. However, malnutrition in the form of both under (e.g. stunting) and over (e.g. obesity)

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nutrition is a concern in India with estimated prevalence rates of 19 % for overweight and obesity<sup>(3)</sup> and 23 % and 31 % for adolescent girls and boys, respectively<sup>(4)</sup>.

Diet and physical activity are important determinants of adolescent nutritional status. However, in low- and middle-income countries, parental education and occupation, household composition, income and socio-economic status are associated with differences in Nutrition<sup>(5)</sup> and physical activity<sup>(6)</sup>. Dietary habits are developed through a myriad of factors including cultural practices, socio-economic status, family rules and personal food preferences<sup>(7)</sup>. Previous research has suggested that interactions with parents, particularly mothers, help to shape adolescents' own dietary preferences and eating habits<sup>(8,9)</sup>. However, India is a transitioning society with a changing economy and lifestyles. Factors such as working parents having less time to cook and growing autonomy throughout adolescence have made it increasingly common for adolescents to be making independent food choices<sup>(10,11)</sup>. Peers also play an increasingly important role in the development of eating habits, especially during adolescence<sup>(12)</sup>. Adolescence is a time when young people begin to look for new groups to attach themselves to outside of their immediate family<sup>(13)</sup>. As a result, adolescents are more likely than children and adults to seek the approval of their peers when choosing food<sup>(14)</sup>. Increased media exposure in recent years, including social media networks, may also influence adolescents' diet and physical activity behaviours. A previous study showed that 90 % of Indian adolescents eat food while watching TV, 82 % buy food products based on advertisement and 59 % skip outdoor activities to watch TV<sup>(15)</sup>. Food advertisements often promote a healthy representation of 'junk' (unhealthy, outside) foods<sup>(16,17)</sup>. Studies have found that the attraction of junk foods is so powerful that adolescents buy them from vendors outside of school, despite having home-prepared lunches<sup>(18,19)</sup>.

To date, no qualitative studies have explored perceptions of diet and physical activity from the perspectives of both adolescents living in Mumbai slums and their caregivers. In order to create effective interventions to improve adolescent nutritional status, it is important to explore their perceptions of what influences their diet and physical activity behaviours.

Thus, this study was carried out to explore adolescent and caregiver perspectives of the facilitators and barriers to a healthy diet and physical activity among adolescents living in urban slums.

## Methods

### *Research design and participants*

#### *Study setting*

A substantial proportion (41 %) of the population of Mumbai lives in slums<sup>(20)</sup>. Adolescents and their caregivers living in

slums in the Khar and Santa Cruz areas of the city were chosen to participate in this study. Mumbai is India's commercial capital and a densely populated mega-city (population 24 million). Most of the dwellings in the Khar and Santa Cruz slums consist of one room per family, built with proper concrete walls but closely packed together and often on top of each other, accessed through narrow alleyways. The majority of these dwellings are legal. Because land is at a premium in Mumbai, not only poor but also some middle class and even professional families reside in the slums. All families have access to legal electricity and piped water (either direct to the dwelling or from a public tap in the street). Most families use public pit toilets.

These slums have an abundance of kiosks and stalls selling salty fried snacks, often prepared unhygienically, at very low cost. In contrast, to purchase fruits and vegetables, people have to walk further, to the local market.

#### *Data collection*

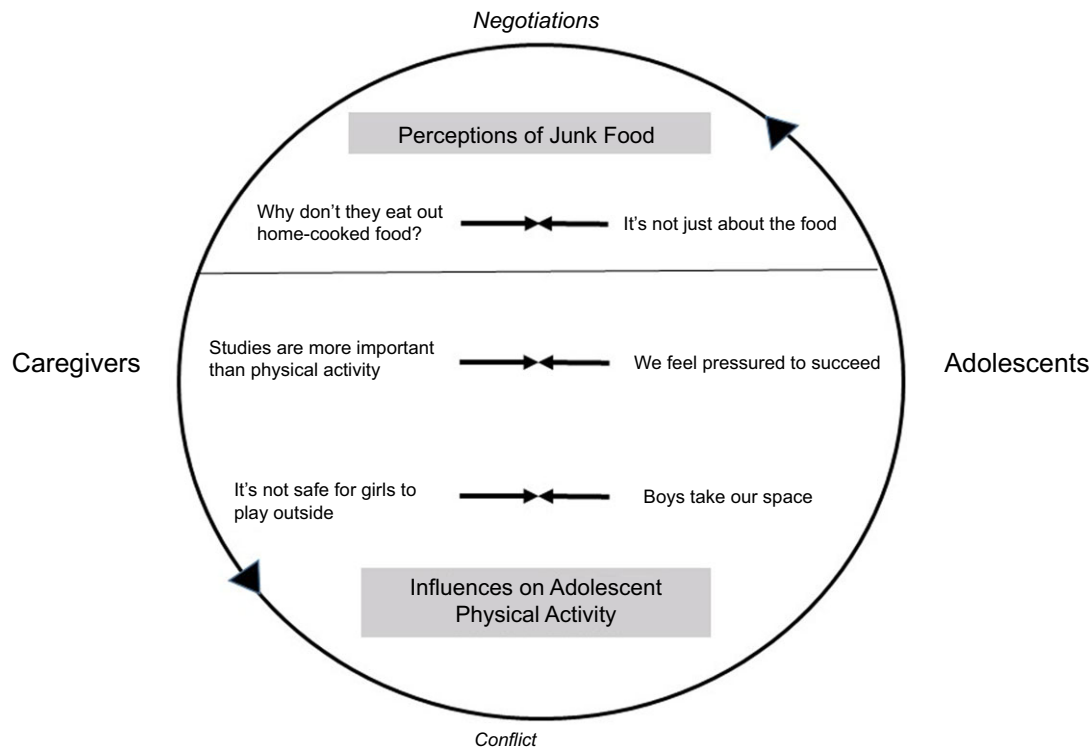
Through other research projects and provision of health services, the research team has a long-standing relationship with communities in these Mumbai slums. Community health workers (women from the community trained by our NGO in communicating health messages) identified adolescents living in the slums aged 10–12 years and 15–17 years. Following this, the researchers had meetings with potential participants in the community to explain the study. Caregivers gave written consent, and adolescents gave written assent to take part. Two pilot focus group discussions (FGD), including different groups of adolescents and caregivers, were conducted to finalise the FGD guide. For the main study, eighty adolescents were recruited using convenience sampling, including forty (twenty boys and twenty girls) younger (10–12 years) and forty (twenty boys and twenty girls) older adolescents (15–17 years). Trained research assistants obtained consent from participants, administered a socio-demographic questionnaire, FFQ and obtained anthropometric data (weight and height) from these eighty adolescents.

A subset of these eighty, including thirty-six adolescents and twenty-three of their caregivers, were selected to take part in FGD (Table 1). The FGD were scheduled in community centres within the slums on a day and time convenient to the participants.

FGD were chosen as the most appropriate data collection method to obtain insights into adolescents' experiences as well as a sense of the social norms arising from group discussion<sup>(21)</sup>. A semi-structured FGD guide was developed and piloted to explore the adolescents' and caregivers' perceptions of influences on diet and physical activity. Six FGD consisting of eight to twelve participants were conducted. The FGD were separated by age to account for developmental differences between early (10–12 years) and late (15–17 years) adolescence, and gender, resulting in two with young adolescents (one each of boys and girls), two with older adolescents (one each of boys and girls)

**Table 1** Characteristics of participants in each focus group discussion (FGD)

Description	FGD 1	FGD 2	FGD 3	FGD 4	FGD 5	FGD 6
Setting	Shantilal Compound	Shantilal Compound	Shantilal Compound	Gaodevi	Nehru Nagar	Gaodevi
Gender	Boys	Girls	Women (caregivers)	Boys	Girls	Women (caregivers)
Age of participants	10–12 years	10–12 years	Adults	15–17 years	15–17 years	Adults
No. of participants	8	9	11	8	11	12



**Fig. 1** Thematic map showing the focus of adolescent and caregiver negotiations surrounding perceptions of adolescent junk food consumption and physical activity

and two with caregivers (one of caregivers of young adolescents and other of caregivers of older adolescents). The data were collected between June and August 2018. Three study investigators (HVC, MJG and SAS) conducted the FGD, rotating roles as facilitator and observer. Prior to each discussion, the participants were briefed about the study aims, procedures and issues of confidentiality. FGD lasted 46–60 min. Participants were provided with snacks and water.

To break the ice, participants were asked to introduce themselves and their hobbies following which, the facilitator asked questions about diet (e.g. what foods do you like to eat, what do you like about those foods) and physical activity (e.g. what activities do you do during the day, what makes you choose this sport or activity) (see the FGD guide in online supplementary material).

**Data analysis**

FGD were audio recorded, transcribed verbatim, translated to English and then compared with the audio to ensure

accuracy. Participants were identified as P1, P2, etc. to ensure confidentiality. Thematic analysis of the data was conducted, following Braun and Clarke’s 2006 step-by-step guide<sup>(22)</sup>. The first step involved familiarisation with the data by reading the transcripts repeatedly. The researchers then inductively coded (using NVivo 12 software) a sample of the transcripts and, along with the coding team (MB, SW and PH-J), developed the coding framework based on emerging themes. The coding framework was revised as coding continued. The primary researcher (HVC) coded all of the transcripts, which were checked by an experienced qualitative researcher (PH-J). Following this, similar codes were merged into categories which were considered in relation to the research questions and refined to form major themes and subthemes. Major themes were then reviewed and arranged to form a thematic map (Fig. 1). The final step involved defining and naming the major themes and sub themes followed by producing the report that includes illustrative quotes from the transcripts.

**Table 2** Anthropometry and socio-demographic characteristics of the participants\*

Anthropometry	Age groups											
	10–12 years						15–17 years					
	Boys			Girls			Boys			Girls		
<i>n</i>	20			20			20			20		
Age groups (years)	10–10.9	11–11.9	12–12.9	10–10.9	11–11.9	12–12.9	15–15.9	16–16.9	17–17.9	15–15.9	16–16.9	17–17.9
<i>n</i>	11	4	5	10	9	1	12	6	2	12	4	4
Weight (kg)												
Mean	29.59	29.58	27.84	27.74	29.16	43.3	45.61	49.11	57.7	43.26	60.1	41.26
SD	5.6	3.9	1.5	6.0	4.4	0	5.47	10.23	18.17	10.55	21.14	4.22
Height (cm)												
Mean	134.46	137.4	135.89	134.75	141.32	149.8	158.9	162.62	167.25	150.36	149.9	154.68
SD	5.13	3.77	5.42	5.6	9.3	0	7.89	6.74	5.3	5.88	7.29	3.24
Height for age Z												
Mean	–1.20			–1.04			–1.36			–1.63		
SD	0.92			0.998			0.89			0.82		
Stunting (%)	10			20			20			30		
BMI (kg/m <sup>2</sup> )												
Mean	16.29	15.63	15.12	15.13	14.54	19.3	18.07	18.8	20.45	18.98	26.42	17.21
SD	2.55	1.41	1.31	2.23	0.93	0	1.85	5.23	5.20	3.43	7.75	1.21
BMI for age Z												
Mean	–0.88			–1.38			–1.03			–0.53		
SD	1.36			1.16			1.43			1.53		
Low BMI (%)	30			30			30			15		
Overweight (%)	10			0			0			10		
Obese (%)	0			0			5			5		
Socio-demographic												
Education in years												
Mother												
Median	10						7					
IQR	7, 12						3, 10					
Head of household												
Median	10						8					
IQR	9, 10						5, 10					
Mother occupation												
Paid employed												
<i>n</i>	8						8					
%	20						20					
Self employed												
<i>n</i>	5						1					
%	12.5						2.5					
Not employed												
<i>n</i>	27						30					
%	67.5						75					
No response												
<i>n</i>	0						1					
%	0						2.5					



**Table 2** Continued

Anthropometry	Age groups			
	10–12 years		15–17 years	
	Boys	Girls	Boys	Girls
Head of household occupation				
Paid employed				
<i>n</i>	28		22	55
%	71.8			
Self employed				
<i>n</i>	10		15	37.5
%	25.6			
Not employed				
<i>n</i>	1		1	2.5
%	2.6			
No response				
<i>n</i>	0		2	5
%	0			

IOR, Interquartile range.

\*Height for age Z, BMI for age Z, stunting, thin, overweight and obese are defined using WHO 2007.

**Results**

**Participant characteristics**

Characteristics of the larger pool of eighty adolescents are shown in Table 2. All adolescents had easy access to low-cost junk food<sup>(Fall *et al.* in this issue)</sup>. These include carbohydrate-rich fried snacks (wada and samosa), modified versions of Chinese foods (Chinese bhel and Chinese bhajiya) and tangy snacks called ‘chaats’.

From the FGD, it was clear that adolescents and their caregivers had very different perspectives on adolescent diet and physical activity. Both groups described on-going negotiations which were focused around adolescent junk food consumption and perceived influences on their physical activity. In order to depict these negotiations, two major themes are presented below: (a) perceptions of junk food and (b) understanding of the influences on adolescents’ physical activity. Perceptions of junk food are presented from caregiver (‘*Why don’t they eat our home cooked food?*’) and adolescent (‘*It’s not just about the food?*’) perspectives. The two main insights on adolescent physical activity identified were *Academic pressure* and gender differences in physical activity opportunities (‘*Girls not allowed?*’). Data describing these perceptions are presented separately for caregivers and adolescents.

**Perceptions of junk food**

Despite having a clear understanding of the health consequences of eating junk food, all of the adolescents admitted to eating it regularly. Adolescents and caregivers had different perspectives on what influenced adolescent junk food consumption.

*Why don’t they eat our home-cooked food?*

It was clear that caregivers underestimated adolescents’ health-related knowledge, based on the adolescents’ diet-related behaviours. Caregivers saw adolescents eating unhealthy junk foods and assumed this was because they were unaware of the potential consequences to health. Interestingly, the caregivers, particularly of older adolescents, seemed to be unsure of their own nutrition-related knowledge:

*According to us we give them [healthy food] but whether that is nutritious or balanced diet or not, [we] don’t know. (Caregiver FGD 6)*

Caregivers were perplexed that adolescents continued to prefer outside food, despite their advice and warnings against doing so.

*Children nowadays want packaged foods like wafers, kurkure (corn-based salted snacks sold in packets).... No one wants to eat chapati and vegetables. (Caregiver FGD 6)*

*They listen to me, but if I say no they retaliate. (Caregiver, FGD 3)*



They felt this might be because, as they got older, adolescents became more influenced by their peers and less influenced by family. Caregivers were frustrated that adolescents would rather eat junk food with their peers than at home with the family, which was better for them:

*Once they start to go out with friends we cannot hold their hands and stop them. They will eat with friends for sure. (Caregiver, FGD 3)*

Mothers made efforts to encourage adolescents to eat home-cooked food by trying to recreate popular junk food items ('Chinese' noodles, French fries, burger and pizza) at home. However, the adolescents either did not eat these dishes, or they ate much less than the traditional food they would normally eat at home. This suggests that the taste of the food is less important in influencing adolescent diet than the social aspect.

*In spite of taking efforts of looking at YouTube and also asking recipes from others, they [the adolescents] still they don't like home [cooked] food. (Caregiver, FGD 3)*

Caregivers were frustrated and thought they had less control over their adolescents' behaviours, compared with when they themselves were adolescents. Children were seen to be less respectful of parental opinions once they reach adolescence, when they would eat whatever they liked. Parents were able to 'force' children to eat healthily; however, adolescents could not be forced and indeed rebelled.

*When my child was 4–5 years old I have told him that you will get maggi (instant savoury noodles) only once a week. For 2–3 years it was fine but when he grew up he was not agreeing or listening. (Caregiver, FGD 3)*

*Until they are in 10<sup>th</sup> standard [age 15 years] they somewhat listen to us and they are under some control. Once they complete 10<sup>th</sup> and go to college, they become independent. They get wings and start flying. (Caregiver, FGD 3)*

#### *It's not just about the food*

In contrast to their caregivers' beliefs, adolescents were knowledgeable about nutrition and its effect on health. They understood that home-made foods were generally healthier than junk foods which often contained additives and were generally prepared and stored in an unhygienic environment:

*Healthy food is no oily food, no fats; it should have proteins and vitamins. Outside food [is] not healthy. (Young adolescent boy, FGD 1)*

*They mix up colours [chemicals] in the outside food. (Older Adolescent girl, FGD 4)*

Despite eating junk foods, adolescents felt that their parents largely controlled their diets, parental preferences

and beliefs took precedence, and their own dietary requests were often rejected:

*Yes, when my brother wants to eat non-veg [non-vegetarian food e.g. Meat or fish] but mother refuses to cook because of Shraavan month [holy month in Hindu religion] where they don't eat non-vegetarian food. (Young adolescent girl, FGD 2)*

The adolescents saw themselves as being obedient and eating the food their parents wanted them to eat, rather than their preferred meals:

*Whatever mummy cooks, I eat everything. (Young adolescent boy, FGD 1)*

Despite telling researchers that they ate the foods their parents wanted them to eat and that they were aware that home-made food was healthier than junk food, adolescents were bored of eating the same home-cooked dishes. The prominent message being conveyed was that junk food was a way of breaking the monotony of their regular diets:

*We like it. [We] get bored eating the same food at home so, to break monotony, we eat out. (Older Adolescent boy, FGD 5)*

Eating junk food was talked about excitedly and depicted as an important part of adolescents' social lives. Buying and sharing junk food with friends was a way for adolescents to express growing independence away from their parents. They described this as a pleasurable social experience that they really enjoyed. In addition, by pooling their money, adolescent friendship groups could afford to purchase junk food. This might explain why, despite caregivers' efforts to cook junk-style food at home, adolescents still preferred to eat outside:

*Sometimes when we eat in groups [with friends] then we feel nice. (Older Adolescent boy, FGD 5)*

### **Perceptions of influences on adolescent physical activity**

When asked about perceptions of influences on physical activity during adolescence, discussions were focused on academic pressures and gender. Like the discussions about junk food, responses between adolescents and caregivers differed. Each of the two subthemes (*Academic pressure* and *Girls not allowed*) is presented below from the perspectives of caregivers and adolescents.

#### **Academic pressure**

##### *Studies are more important than physical activity*

Caregivers understood that physical activity was important. However, compared with academic studies, physical activity was secondary. They felt that their children did not have time to play or exercise alongside their academic activities:

*My two younger children never go to play because they go to school in the morning and return at*



*2:30, sleep for 1 hour, then they go to tuitions, leave at 5 and return at 7 or 8 pm; then they do homework and its 9 pm. They are busy in their routine and there is no time to play. (Caregiver of young adolescent, FGD 3)*

Caregivers knew that nutrition was important for cognitive development and function, which was therefore viewed as important for academic success. However, no caregivers emphasised the importance of physical activity for cognition.

*All parents think that we should feed our child good food so that child performs better. (Caregivers of older adolescent FGD 6)*

This was a feeling shared by the community as a whole, whereby physical activity was given a low priority within schools. In some of the schools, in physical education, teachers told students to do whatever they liked to do. Boys would sometimes play, sometimes study; but girls would mostly sit and chat or study, and not exercise or play. Physical education is only internally graded by school (the marks do not contribute to the child's 'Board' or official scores), and therefore, it is not given priority like academic subjects.

### **We feel pressured to succeed**

Adolescents knew that physical activity was important for health; however, they felt pressured to prioritise academic, rather than physical, activities. Time was a major issue that stopped adolescents being able to exercise. Within their daily routine and busy schedule (school and extra tuition classes), they struggled to fit in physical activity. The adolescents felt under pressure to perform better academically from their family and community, who, they believed thought academic success to be the most important thing.

*We do not do exercise and also no time due to busy schedule. (Young adolescent girl, FGD 2)*

During school holidays, they were able to carve out some time to play or exercise, although this quickly stopped when term time began again:

*Now we have summer vacation going on so we have time but since school started we don't have time. (Young adolescent girl, FGD 2)*

### **Girls not allowed**

#### *It's not safe*

Caregivers acknowledged that girls were less active than boys and provided many reasons for this, including that girls were either too shy, lazy or simply too busy with household chores. In addition, adolescents reported that, in their community, girls and boys did not play together. This was due to a number of factors including cultural beliefs and community bias; boys' needs for physical activity were prioritised over girls' in access to limited outdoor space.

*There is no rule of boys and girls playing together. The community here is not so modern yet. (Caregiver of young adolescent girl, FGD 3)*

Caregivers felt that it is not safe for their daughters to play outside in the company of strangers or boys. There was no such concern expressed for the boys.

*In this area there is no such rule to leave girls alone to play and it is not safe. (Caregiver of older adolescent girl, FGD 6)*

#### *Boys take our space*

When asked about opportunities to engage in physical activity, the differences between boys and girls were apparent. Many of the older boys engaged in physical activity through after-school employment which usually involved manual labour. This was not mentioned by the girls:

*Whatever work I do in the morning is a type of exercise only. Lifting the milk can and delivering milk to houses. This involves running also. (Older adolescent boy, FGD 5)*

In contrast, the older girls were most likely to engage in physical activity through domestic work:

*Do household work, so don't get time. That is our exercise. (Older adolescent girl, FGD 4)*

Unsurprisingly, due to the crowded nature of Mumbai slums, lack of space and no playgrounds in the vicinity were perceived as a major barrier to physical activity. Adolescents said that they are glued to television and mobile phones due to limited space and no support from the community.

*Girls are busy with mobile; they keep playing on mobile. (Young girl, FGD 2)*

The girls in particular felt that they had no support from the community to engage in physical activity. Girls only had time to play in the late evening, when they were less likely to be allowed to go outside because of family and community restrictions; hence, they stayed in and watched TV instead or used mobile phones.

*Where will I play when boys are playing in the ground? Boys don't let girls play and they fight. (Young girl, FGD 2)*

*[We] cannot go out when boys are playing or around. (Older adolescent girl, FGD 6)*

Although it was viewed as more acceptable for boys to play outside, they reported conflict with community residents over limited space. As a result, many adolescents described playing (e.g. football) virtually, through on-line games.

*Community residents throw water on our face to stop us from playing. Or they use abusive words to throw us out. (Older adolescent boy, FGD 5)*



## Discussion

This study explored adolescent and caregiver perceptions of adolescent diet and physical activity. Caregivers were perplexed regarding adolescents' preferences for junk food. To the adolescents, the social aspect of eating out, buying and sharing junk food with friends was important to them. Caregivers prioritised academic studies over physical activity and feared too much for their daughters' safety to permit outside play. Adolescents wanted to use their limited outdoor space, but girls felt 'pushed out' by boys. These were the focus of conflict/negotiations around diet and physical activity among adolescents and their caregivers, living in Mumbai slums.

Adolescents and their caregivers differed in their perceptions of who controlled adolescent diet. Adolescents felt their diet was dictated by their parents. This is consistent with previous findings from Indian adolescents who also described how their parents would structure and control what they ate<sup>(23)</sup>. In contrast, caregivers in our study felt that they had absolutely no control over their adolescents' food choices. This difference in perspective supports previous qualitative research showing that parents and their adolescents share very different perspectives about adolescent eating behaviours and family mealtimes<sup>(24)</sup>. Caregivers from the current study felt that adolescent diets became harder to 'control' through adolescence, supporting previous findings that age is negatively associated with eating home-made meals and the perception that family meals are important<sup>(25)</sup>.

Caregivers in this study underestimated adolescents' dietary knowledge, assuming that adolescents' only preferred junk food because they did not understand the associated health consequences. In fact, adolescents ate junk food, despite knowing these consequences, to break the monotony of home-cooked food and because they enjoyed the social aspect of eating with peers. This supports previous findings from other study in this issue and other Indian adolescents who enjoyed sharing junk foods with friends despite knowing the potential health consequences<sup>(Banavali *et al.* in this issue, 26,27)</sup>. Taste has also been shown to influence both Indian and Western adolescent dietary decisions over and above the risk of eating unhygienic, non-nutritious foods<sup>(27,28)</sup>. Our study expands on these findings, showing that although the adolescents said that taste was important, when parents replicated junk food recipes, adolescents still preferred to eat outside of the home with their friends. For the adolescents in our study, it was not just about the food. The social aspect of eating junk food (buying and sharing food with friends) outside the home was the key.

For the adolescents in this study, the importance of making *independent* diet and physical activity choices was highlighted by the narrative around junk food negotiations. Although it is widely believed that parental food habits are one of the most dominant determinants of a child's eating

behaviour<sup>(28,29)</sup>, restrictive dietary rules may actually lead to increased intake of restricted foods among children<sup>(30)</sup>. Pressure to consume certain foods, predominantly healthy foods, has also been associated with poor diet quality in low- and middle-income countries<sup>(31)</sup> including both reduced intake of healthy foods and greater intake of nutrient-poor snacks<sup>(31)</sup>. This is echoed in our findings, where caregivers express frustration at not being able to 'force' adolescents to choose home-cooked food over junk food. The caregivers reported that as children transition through adolescence, they are much less likely to adhere to caregiver's dietary rules. Similar observations have been made in a qualitative study with both Indian and Canadian adolescents, as adolescents' age and exercised more autonomy around food, their food choices tend to be less healthy<sup>(26)</sup>.

Although the adolescents understood the health benefits of being physically active, many cultural and environmental factors made it difficult for them to do so. Predominantly, gender differences and prioritisation among caregivers and the wider community of academic achievement meant that opportunities to engage in physical activity, particularly for girls, were sparse. Previous literature from India shows that girls are less physically active than boys<sup>(32,33)</sup>. The present study revealed that these gender differences still exist, with boys dominating the very limited outdoor spaces. Caregivers were particularly concerned about girls' safety in the community and the potential negative consequences of them engaging in activities with boys. This supports previous findings from India<sup>(34)</sup>, Nepal<sup>(35)</sup> and Guatemala<sup>(36)</sup> where caregivers did not want adolescents to play outside due to the perceived unsafe environment, particularly for girls.

Due to the lack of space within the community to play games and socialise, adolescent participants described using digital media as an alternative to engaging in outside play. This was particularly useful for girls, who were not allowed outside in the evenings. Similar findings are reported in a study of twelve African American girls and their caregivers which showed that girls preferred sedentary behaviour rather than active behaviour; this pleased caregivers who associated TV viewing with safe supervision of their daughters<sup>(37)</sup>. As in previous research, participants in the current study acknowledged that boys were given more opportunity to be physically active<sup>(34,38)</sup>. However, even the boys in this study reported that they did not have enough outside spaces to play games as often as they would like, and so resorted to online, or computer games for entertainment.

Another barrier to engaging in physical activity was the pressure to achieve academically by parents. It was important to the caregivers in this study that their children excelled academically. In India, a child's academic achievement is a major priority. As India is a densely populated country, there is enormous competition for employment. Educational achievement makes a profound difference to





young people's chances of earning a high salary job, achieving a reasonable quality of life and finding a suitable spouse.

Findings from a study of adolescents living in Kolkata, India showed that 66% of students felt pressured by parents to perform better academically<sup>(39)</sup>. Consistent with our findings, school-going adolescents living in New Delhi reported increasing displacement of physical activity by sedentary activities<sup>(40)</sup>. Academic workload was the most consistently cited barrier and, along with constant examinations, led to increased stress<sup>(40)</sup>.

### **Implications for public policy**

These findings highlight the need to involve adolescents, caregivers and the wider community in the development of interventions to reduce adolescent junk food consumption and increase physical activity. Engaging key stakeholder perspectives in intervention development can (a) address adolescents' desire for social activities and need for autonomy, (b) take into consideration caregivers' concerns about safety and academic achievement and (c) consider wider cultural and religious factors. A recent development has seen the Central Government of India banning junk food sales in and around schools<sup>(41)</sup>. Future research could benefit from evaluating the impact of this new policy on child/adolescent's dietary behaviours.

These findings suggest that safe, gender-specific spaces could enable girls to engage in physical activity. Existing infrastructure such as schools and colleges may be ideal settings to host gender-specific interventions to encourage physical activity among girls. In addition, allotting the available play area for boys and girls on alternate days or fix play timings for girls and boys might provide opportunities for girls to enjoy outside spaces more often. Physical education is an ungraded school subject given little importance. Future public health interventions could initiate scoring in physical education to increase its perceived value. Reflecting wider global trends, adolescents spend much of their free time using digital media. One method of delivering effective interventions to encourage a healthy diet and physical activity might therefore involve online games or smart phone applications. A major finding from this study was the importance of the social aspect of food for adolescents. Therefore, peer-led approaches may be an effective way of delivering future interventions. Finally, the perceived importance of academic success may be harnessed to improve physical activity by highlighting the links between activity and academic performance<sup>(42)</sup>.

### **Strengths and limitations**

The main strengths of this study are that it included perspectives of adolescents at different stages, and of their caregivers, living in slum communities. Doing so elicited great insight into the differing perspectives of the adolescents compared with their caregivers and highlighted the need to include both when developing effective

interventions to reduce junk food consumption and improve physical activity. FGD were selected as the method of data collection because discussion between people elicits answers that may not have emerged without a conversation. Varying perspectives can be captured at the same time, and consensus within a group, or not, can be captured. The FGD were carried out in the community where participants lived and therefore they felt comfortable. The facilitators were trained in how to engage participants with these discussions, while encouraging them to feel comfortable enough to share honest views. Researchers were provided on-going support and training in data collection, data analysis and write-up. Discussions across the collaborating research groups led to high-quality research and unbiased reporting.

Although all were invited, only female caregivers, mothers and aunts attended the FGD. As no fathers or other male caregivers attended, we were unable to gain insight into their perspective. There are usually challenges in recruiting male caregivers because, culturally in India, men are not included in such discussions and may not be comfortable speaking about 'childcare'. Finally, FGD were conducted in participants' local language (Hindi), transcribed and then translated in English. Therefore, there is a chance that some meaning was lost in translation. In an attempt to address this, translations were checked repeatedly.

### **Conclusion**

These findings offer insights into the complex negotiations between adolescents and caregivers about adolescent diet and physical activity. Intervening during adolescence is particularly important to optimise diet and activity. Therefore, in the development of effective interventions to reduce the consumption of junk foods and increase physical activity, it is important to take into consideration the views of adolescents and their caregivers.

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M.B., S.H.K. and C.H.D.F. wrote the manuscript. *Ethics of human subject participation*: This study was conducted according to the guidelines laid down in the Declaration of Helsinki; all procedures involving study participants were approved by the Inter System Biomedica Ethics Committee (ISBEC), Mumbai (Dated: May 2018). Written informed consent was obtained from all participants. Verbal consent was witnessed and formally recorded.

### Supplementary material

For supplementary material accompanying this paper visit <https://doi.org/10.1017/S1368980020001640>

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