

Food environment and policies in private schools in Kolkata, India

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Summary

School food policies and services have the potential to influence the food practices and eating behaviours of adolescents which in turn may affect their lifestyles and health in adulthood. The aim of this qualitative investigation was to describe the opinions of adolescents, their parents, nutrition educators and school principals about the prevailing food environment and canteen policies in Indian schools. Fifteen adolescents aged 14–15 years, 15 parents, 12 teachers and 10 principals from 10 private schools in Kolkata, India participated in semi-structured interviews. The interview questions were primarily based on the existing literature related to school food environments and policies. Audio recordings were transcribed verbatim and assessed thematically. Throughout the 52 interviews, a number of inadequacies of the school food environment and policies were revealed. These included the absence of written food policies, the widespread supply of unhealthy foods, inadequate provision of healthy foods, misleading messages about food communicated by school authorities, lack of cleanliness in the school canteen and the high cost of canteen food. Current school food environments do not appear to promote healthy eating among adolescents. Therefore, it is important to upgrade the quality of food services in Indian schools through adoption of healthy eating policies.

Key words: adolescent, health promoting environments, nutrition, school

INTRODUCTION

Rapid physical growth during adolescence is associated with increased nutritional demands (UNICEF, 2011; United Nations Population Fund, 2000). Hence, adequate intakes of nutrients and energy are essential to achieve optimum growth potential. The development of healthy eating habits is crucial as eating patterns developed in adolescence are likely to influence long-term food consumption behaviours (Croll *et al.*, 2001; Drewnowski, 1997; Kelder *et al.*, 1994). Considering the importance of adolescent nutrition, schools can play

a significant role in facilitating healthy meal patterns among young people (Contento, 2011).

The school is often regarded as a fundamental unit of the social environment that shapes adolescents' eating behaviours (Centers for Disease Control and Prevention, 1996; Larson and Story, 2009; Maddock *et al.*, 2005; Worsley, 2006). In the school environment, nutrition knowledge transmitted through classroom teaching alone might not be sufficient to influence adolescents' meal patterns because they also need access to healthy food and the support of the people (e.g. teachers,

friends, family) surrounding them (Contento, 2011). Adolescents require a supportive school environment, which enables them to make appropriate food choices that promote health and well-being (Langford *et al.*, 2014; St Leger *et al.*, 2007; Worsley, 2008).

Globally, the easy availability and accessibility of energy-dense, nutrient-poor foods, such as French fries and pizza, during school hours has often been criticized for inculcating sub-optimal dietary habits among adolescents (Cleland *et al.*, 2004; Cullen *et al.*, 2006; French *et al.*, 2003; Maddock *et al.*, 2005; Wiles *et al.*, 2011; Worsley, 2007b). A qualitative inquiry capturing the views of school principals, parents, teachers, students and canteen managers about the quality of food services in primary and secondary schools of South Australia found that school canteens were primarily profit driven (Drummond and Sheppard, 2011). This was confirmed in a number of quantitative studies (Bell and Swinburn, 2004; Cleland *et al.*, 2004; Story *et al.*, 2006). Another notable influence that negatively affects what is sold in the school canteens is students' preference for unhealthy foods (Drummond and Sheppard, 2011).

The school canteen (a school shop mostly selling snack items) is an integral unit of the school food environment (Burke, 2002) and by marketing foods high in sugar, fat and sodium; many school canteens promote unhealthy lifestyles. School canteens can thereby contribute to the burden of obesity and non-communicable diseases among adolescents with the Indian school canteen being no different (Kaur *et al.*, 2012; Mehan *et al.*, 2012; Rani and Sathiyasekaran, 2013; Singhal *et al.*, 2010). Moreover, snacks available in Indian school canteens are mostly prepared by deep frying in saturated fats and trans fats, which increase the risk of obesity and non-communicable diseases (Agrawal *et al.*, 2008; Kaushik *et al.*, 2011). According to a recent systematic review of the epidemiology of childhood overweight and obesity (aged 0–18 years) in India, the combined prevalence of childhood overweight and obesity increased from 16.3% (2001–05) to 19.3% (after 2010) (Ranjani *et al.*, 2016). This mounting prevalence of overweight and obesity needs immediate attention from Indian policy makers.

To overcome these challenges, schools can adopt healthy eating policies that facilitate healthy eating among students. A school food policy is said to 'reflect the values of the school community and ensures the sustainability of the healthy changes made to the school food services by providing a school document that supports the change' (State Government Victoria, 2013). Such policies have the potential to influence the health and nutritional profile of students (World Health

Organization, 2014b). Healthy school food policies have been shown to be effective in encouraging healthy eating among students in different countries (Townsend *et al.*, 2011; Worsley, 2007b, 2008; Young, 1993). In contrast, evidence from India demonstrates that most Indian schools lack food policies (Jadhav and Vali, 2010; Kaur *et al.*, 2012; World Health Organization, 2007). Even the concept of the Health Promoting School (HPS) (World Health Organization, 2014a) is relatively new in the Indian education system (Jadhav and Vali, 2010; Kaur *et al.*, 2012). The HPS is defined as 'one that constantly strengthens its capacity as a healthy setting for living, learning and working' (World Health Organization, 2014a).

As schools endeavour to foster healthy eating, it is important to assess the views of the key stakeholders with regard to the school food environment and policies. Feedback from these stakeholders will help to identify the barriers faced in promoting healthy eating in Indian schools and to identify ways to combat them. Hence, the aim of the present investigation was to examine the perceptions of Indian adolescents, their parents, teachers and principals of the existing school food environment and policies in order to inform the design of school food policies that will assist Indian adolescents to develop healthy eating habits.

METHODS

The methodology for this study has been detailed below, and is described in detail elsewhere (Rathi *et al.*, submitted for publication).

At the outset, 10 private English-medium (i.e. English-speaking) secondary schools (4 single-sex schools and 6 co-educational schools) in Kolkata city, India were shortlisted by the lead researcher (Name). The focus on private schools is supported by the fact that there is a high prevalence of overweight and obesity among private school students, compared with public school students (Mehan *et al.*, 2012; Puri *et al.*, 2008). All the stakeholders were recruited through purposive sampling (Kaplan *et al.*, 1987). School principals were initially invited to take part in this inquiry. It was necessary to recruit school principals as one of the key groups of informants because the school food environment and policies were expected to be mostly influenced by their attitudes and beliefs. Moreover, principals' concerns about the promotion of healthy eating at school are often reflected in their control of the school canteen (Drummond and Sheppard, 2004; Maddock *et al.*, 2005).

The other key stakeholders, i.e. year nine students (age 14–15 years), parents and nutrition educators were recruited with the help of school principals. By making announcements in school assemblies, the principals facilitated the recruitment of nutrition educators and adolescents into the study. The school authorities sent a written note in adolescents' school diaries to invite the parents to participate in the study. Students studying in year nine were selected because they were the school canteens' main customers. Moreover, year nine students had a less crowded academic schedule when compared with year 10 and year 12 students as they were not required to take any national examinations. The views of nutrition educators were significant for this research because they had nutritional expertise and therefore, were likely to be well informed about the functioning of the school canteen. The recruitment of the caregivers was based on the fact that they had knowledge of the influences which affect their teenagers' food habits. Additionally, the caregivers were expected to be aware of their teenager's school food environment.

A Plain Language Statement and Consent Form were provided to all the potential informants. The Deakin University Human Research Ethics Committee requires parents' written approval for any research engaging young people (age 0–18 years). Therefore, both the Plain Language Statement and Consent Form were provided to the adolescents' caregivers. The study was approved by (Name) University's Health Ethics Advisory Group (HEAG-H 171_2014).

The lead researcher (Name) conducted the semi-structured, face-to-face interviews with the informants. Informed written consent was acquired from all the interviewees before the interviews commenced. All the interviews were carried out on the school premises between February 2015 and August 2015. At the beginning of the interview sessions, the interviewees were given a brief verbal introduction to the qualitative inquiry. They were informed that the interviews would be audio recorded and that this data would remain confidential (King, 2004b). However, one school head did not agree to audio recording; consequently, written notes were taken. The interview sessions lasted between 9 and 65 min (average 24 min). As in other qualitative inquiries (Patton, 2002), sample size was determined by data saturation, i.e. the point when no additional thematic information is generated after a number of interviews have been conducted (Liamputtong, 2009).

All the participants were asked a series of open-ended questions about the current school food environment. However, questions regarding school food policies were restricted to school principals only.

The interview schedule was original and was based on a review of literature. The face validity of the interview questions was examined by pre-testing them with the first two respondents from each participant group. Since, the mode of data collection in this pilot study was similar to that of the full-scale study (i.e. very minor alterations in the phrasing and no deletions or additions were made to the proposed interview schedule); the pre-tested information was combined with information gathered from the full-scale study. The questions posed to the different stakeholder groups are presented in Table 1.

Data analyses were carried out simultaneously with the interview sessions to maintain a balance between the two processes (Sandelowski, 2000). The narrative data were transcribed verbatim by the lead researcher (Name) to ensure consistency (Riessman, 2002). On the basis of Template Analysis (King, 2004a), the transcribed information was thematically analysed via the NVivo 10 software program (QSR International Pvt Ltd. 2010). In addition, the Leximancer program (Leximancer Pty Ltd. 2011), a text analytics tools, was also used to confirm the findings generated through NVivo analysis. Adopting the template technique, the lead researcher created a set of codes ('template') representing themes identified in the interviewee accounts (King, 2004a). Subsequently, the descriptive quotations from the informants were linked to the template themes. A detailed description of the interviewees' views and experiences associated with the main themes and illustrative quotations is provided in the Results section.

RESULTS

The adolescents ($n=15$; Boys = 5; Girls = 10), parents ($n=15$; Father = 1; Mothers = 14), teachers ($n=12$; Male = 0; Females = 12) and principals ($n=10$; Male = 1; Females = 9) identified a number of themes associated with the school food environment and food policies. These themes are described below.

A wide range of unhealthy foods is available in school canteens

The easy availability and accessibility of energy-dense, nutrient-poor foods in the school canteen invited a great deal of criticism from most participants. They felt that having greater access to energy-dense, nutrient-poor foods (such as French fries, samosas and sugar sweetened beverages) in the school canteen prompted adolescents to adopt unhealthy eating habits, thus, limiting their consumption of nutritious foods.

Table 1: Interview questions posed to the participants

Adolescent interview questions	Does your school have a canteen? If yes, please describe it. 'It has been observed that many schools propagate healthy eating messages as part of their curriculum but on the contrary they sell junk food.' Do you agree with this statement? Why or Why not?
Parent interview questions	Do you believe that the school food environment can influence your child's food behaviour? Why or Why not? 'It has been observed that many schools propagate healthy eating messages as part of their curriculum but on the contrary they sell junk food.' Do you agree with this statement? Why or Why not?
Teacher interview questions	'It has been observed that many schools propagate healthy eating messages as part of their curriculum but on the contrary they sell junk food.' Do you agree with this statement? Why or Why not?
Principal interview questions	Does your school have a food policy? If yes, can you tell me about it? Do you think that your school food policy positively influences your students' food habits? 'It has been observed that many schools propagate healthy eating messages as part of their curriculum but on the contrary they sell junk food.' Do you agree with this statement? Why or Why not?

I am not happy with the fact that our school canteen is selling junk food. (Female adolescent 8)

I think they (school canteen) also introduced some cakes and pastries recently. . . . (Parent 5)

See our canteen mostly sells junk food like french fries and Maggi (a brand name for instant noodles) which you know is not good for our health! (Teacher 7)

However, 10 adolescents showed their fondness for such unhealthy foods. For example, one year 9 student commented:

Stuff like chocolates, ice cream, samosa, french fries, burger, and pizza are always available in the canteen which I like very much! (Male adolescent 1)

In agreement with the above view, several school principals claimed that there was huge demand from students as well as canteen staff for provision of fast food and high-calorie beverages in the school canteens. Such demands often compelled school authorities to supply unhealthy foods in school canteens as discussed by school principals.

You see we have had a period of no samosas and let me tell you, it has led to unhappiness everywhere in the sense the teachers may be unhappy, but the students definitely yes and the man who runs the canteen. You see he makes a lot of money from the samosas. So we had to have a bit of compromise. (Principal 1)

Students will not have fruit salad. Fruits are to be eaten at home. Fruits are for home! 'Why should I have this here? Here I rather have you know french fries!' They wanted it! (Principal 2)

Limited availability of healthy foods in school canteens.

Forty-two participants expressed concern over the inadequate provision of healthy foods in the school canteen. In addition, the lack of variety in the school canteen menu was also a matter of deep concern for some participants, particularly the parents.

Yes definitely the canteen should be a healthy one but unfortunately items sold here are basically junk! (Teacher 12)

You know they (school canteen) serve the same food every day so it's not nice, Right! (Parent 8)

These two inadequacies inhibited adolescents from consuming food in the canteen as reported by several participants. Hence, adolescents were encouraged to bring home-prepared lunches and snacks to school.

Hardly any healthy stuff is available in her canteen so she gets home cooked food to school. (Parent 7)

We make sure that every parent-teacher meeting we ask parents to send healthy tiffins (lunch box) for their kids. (Principal 10)

To overcome these inadequacies, the participants suggested certain healthy eating strategies to support students. One recommendation included the provision of tasty, nutritious and affordable food in school canteens while curtailing the sale of unhealthy foods.

I feel the canteen should sell items which are tasty as well as good for our health. (Female adolescent 9)

I think they (school canteen) also introduced some cakes and pastries recently, I think those things may be cut down a bit as they are not good for children. (Parent 5)

Involvement of parents and students in the functioning of the school canteen was also cited as a possible healthy eating initiative.

See it would be nice if students and parents give their inputs in canteen activities. . . (Teacher 1)

However, seven parents noted that school authorities did not encourage parental participation in school affairs.

I am not involved in setting up the school canteen menu. If I intervene, it may affect my son you know! (Parent 13)

Misleading message transmitted by school canteens

Nearly, all the participants criticized the school canteen for spreading ambiguous messages across the student community. The sale of unhealthy foods in the school canteen contradicted the healthy eating messages communicated during food and nutrition classes. Such inconsistencies led to misunderstandings among students, thus, preventing them from making healthy food choices.

Yes we are giving a wrong message because we tell them that this is unhealthy and this is junk, and it is not good for your health as it will lead to obesity but at the same time in the canteen we are selling all the wrong stuff. This is absolutely not done! (Teacher 12)

It is taught that we are not supposed to have junk food, we should have nutritious food but junk food is actually served in our canteen. . . . (Female adolescent 5)

Seeing these inconsistencies, almost all the participants recommended that school management should provide food environments supportive of the nutrition curriculum to foster healthy eating in students.

See if they stop selling junk food then they will be able to do justice with their teaching. (Parent 4)

Hygiene and sanitation in the school canteen

During the interviews, it was revealed that cleanliness was an important component of the school food environment. Because of unhygienic practices carried out in canteens, many students refrained from purchasing canteen food.

At times we like to eat in the school canteen with friends but it is not that safe because it is not clean. (Female adolescent 8)

Consequently, to improve cleanliness in the school canteen, some participants recommended that canteen

personnel should implement certain hygienic and food safety measures. For instance, one teacher described it as follows:

At least the water purifier should be cleaned once a week! (Teacher 7)

Price of food sold in the canteen

The cost of food sold in the school canteen may have influenced the food intake of secondary school students. According to the majority of the participants, particularly, the adolescents and their parents, school canteens sell foods at inflated prices, thus, restricting adolescents from buying those foods. Moreover, sub-standard quality food ingredients were used for canteen food preparation as cited by some participants.

In our school canteen the food that is cooked is really delicious but the problem is its very expensive (Female adolescent 8)

See the food available in my son's canteen is a bit costly! I also feel that quality of food is deteriorating day by day! So I ask him (son) to carry lunch from home. But he (son) doesn't bother to listen! (Parent 12)

Some even claimed that healthy foods were more expensive in comparison to unhealthy foods.

You know the junk is food is cheap so the kids love it but the sandwiches and the other healthy ones are a bit pricy! (Parent 5)

In addition, the limited amount of pocket money received by adolescents was also cited as a potential barrier in purchasing expensive foods and drinks at school. In light of these issues, some caregivers and teachers spoke about improving the quality of food available in the school canteen as well as making it more affordable for the adolescents to purchase them.

See if the canteen food is good and reasonable then they (adolescents) do not have to carry their tiffins (lunch box) from home (Teacher 5)

On the other hand, five adolescents believed that the foods available in the school canteen were reasonably priced and hence they could purchase any food or drink without over spending.

I am pretty happy with the school canteen because the school canteen is not at all costly. . . . (Male adolescent 2)
One good point is that canteen food is very cheap so I can buy anything I like to eat. . . (Female adolescent 4)

School canteens practise vegetarianism

According to some participants, particularly the adolescents, school canteens promoted a vegetarian culture.

Only vegetarian foods (lactovegetarian or lacto-ovo vegetarian or both) were supplied in all ten schools. Most of the adolescents saw this as indicative of a healthy school food environment.

Our canteen is purely vegetarian! (Male adolescent 3)
See our canteen does not sell fried chicken or mutton chops. It is strictly vegetarian. I think it is good to have vegetarian stuff at times! (Female adolescent 8)

School canteens stimulate social development

Besides influencing the adolescents' food behaviours, the school canteen was also seen to play a crucial role in their social development. A number of participants described the school canteen as a social hub which helped to cultivate various socializing skills among the pupils. The adolescents relished sharing their daily experiences and food with their peers in the school canteen. Several of the stakeholders believed that students enjoyed spending time in the school canteen which had a special place in their lives.

Yes of course the canteen has a positive impact on our children because canteen is a place where you know lot of social skills are developed and things like that! (Principal 6)

My daughter is crazy about her school canteen because this is the place where she is hooked up with her friends! She gets to enjoy with her friends! It's like party time for her (Parent 2)

Absence of written food policies

In addition to the school food environment, the 10 school principals also voiced their opinions about food policies. Out of 10 schools, only 4 schools had a written food policy. The four school heads claimed that the students along with the teaching faculty as well as the canteen staff abided by the rules specified in the policy. Regular food inspections, maintenance of a hygienic dining environment and prohibition of the sale of packaged energy-dense, nutrient-poor foods and sugar sweetened beverages were important components of the written food policies as observed by four principals.

Yes, we have a written food policy. See no packaged foods or drinks are allowed inside our school canteen. We believe in selling freshly prepared foods. (Principal 9)

Food policy is in writing and it says very, very clean, hygienic, vegetarian meal. You know by and large everyone follows it. (Principal 3)

However, the remaining principals of six schools claimed they had verbal food policies. They shared

mixed views about the implementation of food policies. Four of them were in favour of a written food policy. They believed that a written policy would assist in combating the challenges posed by a rapidly proliferating fast food industry. Moreover, it was much easier to defy a verbal policy when compared with a written policy.

See we don't have a food policy as such, nothing in written; although I feel it is important because nowadays there is lot of junk food around, Right! (Principal 2)

There is no written food policy. I feel that if it was a written document they (students) would have taken it more seriously. (Principal 7)

Two principals opposed the introduction of a written policy as they feared that the policy might not be suitable for their environment.

See I am not sure about the success of a written policy as kids usually don't like to have healthy stuff! Then we have the canteen owner and his demands, so there are lot of complications, Right! (Principal 4)

DISCUSSION

Similar to studies conducted in other countries (Cleland *et al.*, 2004; Maddock *et al.*, 2005; Story *et al.*, 2002; Winson, 2008), the results from this study confirm that school canteens are a major source of energy-dense and nutrient-poor foods. The school canteen was often criticized for encouraging adolescents to choose such unhealthy foods, particularly if access to healthy foods was less convenient, a criticism widely reported by overseas researchers (Cusatis and Shannon, 1996; French *et al.*, 2003; Neumark-Sztainer *et al.*, 2005; Vereecken *et al.*, 2005). A number of international investigators have claimed that school canteens are primarily profit driven and this prevents them from marketing foods that foster healthy eating practices (Bell and Swinburn, 2004; Cleland *et al.*, 2004; Drummond and Sheppard, 2011; Story *et al.*, 2006), a finding also confirmed in the present investigation. The school principals observed that adolescents' fondness for unhealthy foods often negatively affected the quality of school food services, an observation also found in previous research (Drummond and Sheppard, 2011).

Many of the interviewees expressed their dissatisfaction over the limited provision of nutritious canteen food and monotonous canteen menus. Both these shortcomings prevented adolescents from consuming food in the canteen. Therefore, to facilitate healthy eating, the interviewees recommended that schools should increase

the availability of novel, reasonably priced, nutrient-rich foods while restricting the sale of energy-dense and nutrient-poor products. The previous international research has indicated that such healthy eating initiatives have brought about increases in the prevalence of healthy eating among students (French *et al.*, 2004; Mensink *et al.*, 2012; Story *et al.*, 2009; Townsend *et al.*, 2011; Worsley, 2007b). An exemplar of such a healthy eating initiative is 'The New South Wales Fresh Taste Program', an environmental intervention targeted at promoting healthy food choices in Australian school canteens (Nutrition and Physical Activity Branch, 2006). This programme adopted a 'traffic light' system approach, whereby, the 'green foods', i.e. fruits and vegetables dominated the canteen menu followed by 'amber foods' while the supply of 'red foods', i.e. foods with very high calorie densities (e.g. savoury and sweet pastries, pizza) was restricted to only 2 days per academic term (Nutrition and Physical Activity Branch, 2006). This initiative resulted in a significant decline in the purchase of nutrient-poor foods by Australian students during school hours (Nutrition and Physical Activity Branch, 2006). Student participation in the functioning of the school canteen was also viewed as a viable strategy to optimize healthy eating among students, a finding endorsed in the literature (Marshall *et al.*, 2000; St Leger *et al.*, 2007).

Almost all the respondents held the school authorities accountable for misguiding students through the sale of unhealthy foods in the school premises. It was observed that the healthy eating messages conveyed during nutrition classes were frequently undermined by the sale of unhealthy foods and drinks in the school canteen. Such inconsistencies between classroom teaching and school food services have been widely reported in the past (Mehan *et al.*, 2012; Pivcevic, 2011; Wiles *et al.*, 2011; Worsley, 2007a). Renewed focus on synchronizing the communications between the nutrition curriculum and the school food supply to foster healthy eating among adolescents is warranted (Langford *et al.*, 2014; St Leger *et al.*, 2007; Worsley, 2008).

Hygiene and sanitation were described as important components of the school food environment. This view is similar to one of the four modules of the Focus Resources on Effective School Health (FRESH) framework, i.e. provision of safe drinking water and sanitation (Schools and Health, 2014). An unhygienic school canteen was often cited as a barrier to students' consumption of canteen food. This demonstrates the wide support for safe, hygienic school canteens.

Several participants complained about the high cost of food supplied in the school canteen. Moreover, it was

observed that the nutritious foods offered by the school food services tended to be more expensive than unhealthy products, a finding also confirmed by Shepherd *et al.* (Shepherd *et al.*, 2006). To combat the low affordability of healthy foods, some caregivers and teachers recommended that schools should reduce the price of such foods without compromising on their quality. A number of secondary school nutrition interventions have demonstrated that price reduction strategies are useful in supporting healthy eating (Evans *et al.*, 2006; French *et al.*, 1997, 2001; Shepherd *et al.*, 2006). In spite of these barriers, the sale of unhealthy foods in the school canteens was relatively high. This could be partly attributed to the on-going nutrition transition (Popkin *et al.*, 2001; Shetty, 2013; Popkin and Ng, 2007) that has triggered over production and consumption of ultra-processed convenience foods (Carlisle and Hanlon, 2014; Misra *et al.*, 2011; National Institute of Nutrition, 2010).

The provision of vegetarian foods in the school canteen was seen to facilitate adolescents' healthy eating. This practice of vegetarianism carried out by school canteens reflects a highly vegetarian Indian culture (International Vegetarian Union, 2005). Paradoxically, the vegetarian foods sold in the canteens were primarily potato-based and deep-fried, raising questions over the healthiness of such foods. The prevalence of iron deficiency anaemia remains high in India (Gopalan, 2013; National Institute of Nutrition, 2010) and availability of iron rich animal-based products or vegetarian products with greater density of legumes, beans or nuts may be more appropriate foods (Gibson *et al.*, 1997).

Some interviewees also discussed the potential of school canteens to enhance the social development of adolescents. This agrees with the literature on socialization; schools have been recognized as important agents responsible for developing social skills among adolescents (Catalano *et al.*, 2004; Hello *et al.*, 2004; Wentzel, 2015).

The negative feedback about the Indian school food environment reflects the absence of healthy school food policies. Only four school principals claimed to have a written food policy. This finding is consistent with the previous research that suggests that most Indian schools lack policies related to health and nutrition (Jadhav and Vali, 2010; Kaur *et al.*, 2012; World Health Organization, 2007). In contrast, many schools in the USA, the UK, Australia and New Zealand have written food policies (Townsend *et al.*, 2011; Weichselbaum and Buttriss, 2014; Worsley, 2008; Young, 1993). Some components of the written policies including regular canteen inspections and provision of contaminant-free

foods in school canteens were also highlighted by the four principals. However, these claims cannot be endorsed by published evidence. Moreover, when asked by the lead researcher for a copy of the written food policy, none of the four school principals seemed interested in sharing them. One possible reason behind the principals' reluctance could be that the components were not clearly specified in the printed document. Similarly, in the previous study the majority of Dutch primary school principals was unsuccessful in defining food rules with clarity, thereby encountering difficulty in enforcing these rules (Van Ansem *et al.*, 2013).

Perhaps, some of the principals' doubts about the likely success of school food policies could be eliminated by consulting all the key stakeholders associated with school canteen operations prior to the introduction of the food policy, a strategy recommended by a number of researchers (Chaleunsouk and Kutsyuruba, 2014; Van Ansem *et al.*, 2013; Worsley, 2008).

It is worth noting that no school food policies, i.e. written and verbal have been defined by any Indian Government protocol. Correspondingly, the concept of the HPS (World Health Organization, 2014a) is still quite novel in India (Jadhav and Vali, 2010; Kaur *et al.*, 2012). This HPS charter has been successful in reducing students' body mass index, increasing physical activity and fitness levels and fruit and vegetable intake in other countries (Langford *et al.*, 2014). In the light of the advantages of the HPS approach, it would be sensible to apply this health initiative in both private and public schools in India.

The limitations of this qualitative inquiry should be addressed when interpreting the above findings. First, the study sample may not be representative of Indian schools in general because the selection of interviewees was restricted to metropolitan Kolkata. Second, limiting the study to private schools only limits the generalizability of the findings. However, it should be noted that private school children exhibit a high prevalence of overweight and obesity compared with their public school counterparts (Mehan *et al.*, 2012; Puri *et al.*, 2008), signifying, the need for a research inquiry in private schools. Third, socially desirable responses of the participants might also represent a source of bias in the present inquiry. Nevertheless, the harsh criticism of the Indian school food environment by the four stakeholder groups suggests that socially desirable responses were diminished. Fourth, there was an uneven distribution of the sexes within the sample. The predominance of female adult participants can be attributed to the greater interest of mothers in food and nutrition than fathers, the fact that in India most teachers of food and

nutrition are women, and, that the heads of secondary schools are usually women. Perhaps, the similarities in the opinions of both female and male adolescents regarding the school dining environment negate this gender bias. Therefore, to improve the generalizability of the present findings, the views of non-metropolitan Indian stakeholders from varied cultural backgrounds should be explored in future. Furthermore, future research should also focus on the examination of food environment in Indian public schools.

Regardless of these limitations, strong similarities in perceptions about the school food environment between most participants show the willingness for upgrading the school food environment through implementation of healthy canteen policies. The findings from this qualitative inquiry are significant for India as well as other low- and middle-income countries experiencing globalization.

CONCLUSION

This study provides unique insights into the responses of the key stakeholders in the Indian education system towards the school food environment and policies. The 52 participants exposed the weaknesses of the school food environment, thus, justifying the need for reinventing the school canteen to meet the health needs of adolescents. These findings suggest that many Indian schools do not have effective healthy eating policies.

Since, many existing school food environments do not support healthy eating among secondary school students, it is important to improve the quality of school food services by motivating school principals to adopt healthy eating food policies. These eating policies should be designed with the objective of increasing the availability, accessibility, variety and affordability of nutritious foods in the school canteen. Despite some reservation it is clear that the four groups of stakeholders were critical of the present school food policy status quo and want reform.

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