

# Addressing adolescent anaemia in vulnerable urban Indian communities: A qualitative exploration

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#### Abstract

**Objective:** Anaemia is a health problem for adolescents in India. This paper examines the nuanced transformations triggered by a multi-pronged, community-based anaemia intervention with adolescents and their families, seeking meaningful insights for future nutrition and anaemia programmes.

Design: Qualitative study rooted in critical theory.

**Setting:** Three slum communities – Dharavi and Kandivali (in Mumbai) and Kalwa (in Thane) in Maharashtra, India.

**Methods:** Data were collected through focus-group discussions and in-depth interviews with young people, parents and other stakeholders. Content analysis of drawings of a nutritious food plate by participants supplemented discussion and interview data. Thematic analysis was undertaken manually using a grounded theory approach.

**Findings:** Nutrition education with adolescents and parents led to reduced junk food consumption although reinforcement of the information provided was necessary to sustain the change. Parental support was a crucial factor in ensuring anaemia treatment compliance but was affected by a lack of awareness regarding the consequences of anaemia and the nutritional requirements of anaemic adolescents. Other factors, including the pampering of boys, the neglect of girls and the heavy workload of mothers influenced treatment compliance. Awareness and agency among adolescents contributed to a supportive environment in terms of raised consciousness and better sanitation within families and the community.

**Conclusion:** Findings highlight the need for a holistic approach to address anaemia among young people. While nutrition and health education are important to address treatment noncompliance, this approach should also focus on factors such as socioeconomic status, gender equity, health prioritisation, family involvement and engaging young people as agents of change to promote an enabling environment.

#### Keywords

Adolescents, anaemia, community-based intervention, India, nutrition, urban health

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### Introduction

The World Health Organization (WHO) recognises anaemia as a public health problem affecting both developing and developed countries. The risk of anaemia is more serious for adolescents as the accelerated iron requirement of their growing bodies is rarely matched by dietary intake; the impact is also severe as physical growth, learning capacities as well as pregnancy outcomes are adversely affected by anaemia (WHO, Regional Office for South East Asia, 2011).

A comprehensive national nutrition survey by the Government of India, United Nations Children's Fund (UNICEF) and Population Council (2019) estimated that 40% girls and 18% boys in the age group of 10 to 19 years in India are anaemic. Girls were more disadvantaged due to early marriage and pregnancy as well as gender-based discrimination affecting quantity and quality of food intake (Kalyanwala et al., 2013). Young people's preference for non-nutritious food accounted for deficits leading to anaemia (Hemalathaa and Mary, 2013).

Studies have also shown that adolescents from informal settlements (Chaudhary et al., 2006), and specifically those lacking toilet facilities within the home (Sahu et al., 2014) are prone to anaemia. One out of six of India's population lives in such a setting (Office of the Registrar General and Census Commissioner, India, 2011) – urban slums characterised by poor water, sanitation and hygiene conditions leading to high rates of infection and worm infestation (Karn and Harada, 2002), which ultimately contribute to anaemia (WHO, Regional Office for South East Asia, 2011).

The countrywide Weekly Iron and Folic Acid Supplementation (WIFS) programme launched by the Government of India in 2013, and implemented through the public health system, failed to reach its objective of preventing anaemia (Malhotra et al., 2015; National Institution for Transforming India, Government of India, 2019; Vemuri et al., 2019). Recent research reveals continued high levels of adolescent anaemia especially among girls in rural as well as urban areas (Yadav et al., 2017), justifying the need for sustained non-governmental efforts in this field.

The Society for Nutrition Education and Health Action (SNEHA) is a non-governmental organisation (NGO) working towards improved health outcomes of women and children in urban slum communities. SNEHA's adolescent and youth programme, titled Empowerment, Health and Sexuality of Adolescents (EHSAS), aims to promote health and well-being in the age group of 10 to 19 years. The programme offers interventions to improve nutrition and reduce the incidence of anaemia. Documenting the nuanced transformations triggered by these interventions will add to the literature capturing the experiences of the target group.

### **Geographical setting**

The programme focused on here was implemented in Dharavi, in the centre of Mumbai; in Kandivali, a north-western suburb of Mumbai; and in Kalwa, a peri-urban community in Thane district of Maharashtra. All three community locations are informal settlements – overcrowded spaces with poor civic amenities and abysmal sanitation (Karn and Harada, 2002). They are inhabited mostly by migrants from different states, caught up in a cycle of lack of education, poverty and ill health. In Dharavi, the programme operated in a catchment area served by five public health posts (PHPs) with a population of 433,300. In Kandivali, the programme catchment area covered a population of 150,936 served by two PHPs, and in Kalwa, a population of 194,465 was served by three PHPs.

### **Programme description**

Between 2016 and 2019, the EHSAS programme utilised a multi-pronged strategy to promote anaemia management. The programme objectives and activities are described in Table 1. In addition to working directly with adolescents, the programme aimed to create an enabling environment

Objectives	Activities	Frequency of activities
To build awareness regarding nutrition, sanitation and hygiene	Group education sessions conducted in groups comprising 10–15 adolescents	Four sessions with each group, one session per fortnight
To ensure reinforcement of messages and enable positive change in family dietary practices	a. Session on nutrition, sanitation and hygiene with parents in groups of 10–15;	a. One session with each group
	<ul> <li>b. Community campaign on nutrition using street play;</li> </ul>	b. One at each site
		c. As per community needs
	c. Corner meetings and sessions in local schools	
To enable better sanitation facilities within the community	Guiding participants volunteering to engage with local administrative system and the police	As required by the volunteers
To streamline screening, detection and treatment of anaemia	<ul> <li>a. Health camps in collaboration with other NGOs/PHPs followed by explanation of screening results to parents and adolescents;</li> </ul>	a. Twice a year
		b. As per protocol
	b. Treatment and referral facilities to	c. Fortnightly for treatment duration
	adolescents with anaemia;	
	c. Home visits to ensure treatment compliance	
To promote adolescent-friendly public health services	<ul> <li>a. Consultations with PHP staff to build awareness of adolescent health issues;</li> </ul>	a. As permitted by the PHP staff
	<ul> <li>Group visits by adolescents to PHPs for health services</li> </ul>	b. Monthly one group

Table I. Programme description.

NGO: non-governmental organisation; PHP: public health post.

through interventions with families, schools and the community as well as the local public health and administrative systems. The programme stressed the involvement of young people as key collaborators in this effort.

Young people identified with anaemia were categorised into mild (Haemoglobin [Hb] 11.0– 12.9 g/dL in case of boys and 11.0–11.9 g/dL in case of girls), moderate (Hb 8.0–10.9 g/dL) and severe (Hb less than 8 g/dL) based on WHO (2011) guidelines. The treatment protocol was drawn up jointly with the Municipal Corporation of Greater Mumbai's Lokmanya Tilak Municipal Medical College. Those with mild anaemia were given deworming and weekly Iron and Folic Acid (IFA) tablets from the PHP, while a Ferrous Ascorbate (100 mg elemental iron) tablet was given twice a day to those with moderate anaemia for 3 months and for a further 2 months if required. Severely anaemic young people were referred to secondary or tertiary public hospitals. Health and nutrition counselling was provided to all.

# Study methodology

The study's conceptual framework was informed by the theoretical underpinnings of the programme and its focus on capabilities and human rights. According to the capabilities approach (Sen, 1985), good health, adequate nutrition, adequate shelter, mobility, opportunities for sexual

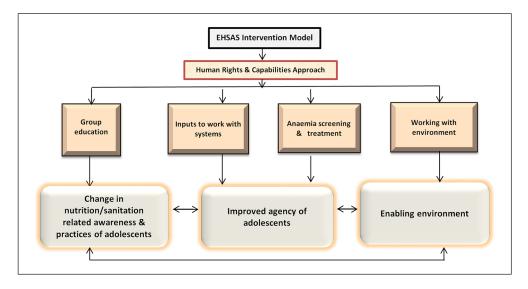


Figure 1. Conceptual framework.

satisfaction and choice in reproduction influence and enhance human abilities. The human rights approach (Nussbaum and Dixon, 2012) identifies civil liberties, political participation, education and employment as pre-requisites for such enhancement. The relationship between these two components in the context of an adolescent anaemia intervention, which emerged as the study progressed, is depicted in Figure 1.

During this exploration, the researchers engaged actively with the subjects of research. The researchers' worldview was informed by Horkheimer's understanding of as knowledge embedded in perspectives of interdependent individuals (Corradetti, n.d.). Informed by a critical theory perspective, the researchers saw anaemia as more than a biological condition of iron deficiency of the blood but as related to different forms of deprivation such as poverty and gender inequity, which are part of people's lives in urban informal settlements and impact physical health and well-being. The study approach concerned itself with the link between understanding and human interests – material, social, economic and ideological (Bolanos, 2013). Evidence gathered was systematically sorted and analysed using an inductive process informed by grounded theory (Charmaz, 2005).

### Methods

Data collection and analysis were carried out by two independent women researchers (V.A. and N.S.) with experience of working on gender issues, seeking to explore how being a girl or a woman mediated access to nutrition and health care in a patriarchal system.

The young participants were selected purposively, ensuring representation across age (equal number of participants between the two age groups of 10–14 years and 15–19 years), sex and different programme sites. Parents were selected considering age, sex and location of their children. For collecting data from stakeholders such as health workers and teachers, a convenience sample had to be used.

## Data sources and methods of data collection

Aligned with a belief in critical theory that research should translate into 'action' and positive change (Scotland, 2012), the focus of the study was on refining and strengthening interventions. Data were collected after the introduction of each intervention and at different points in the programme timeline, from participants who were not necessarily the same. For example, participants who received treatment for anaemia were different from those who had volunteered to work on sanitation issues. All the young people participated in group education sessions irrespective of these differences. Information about nutrition awareness and dietary practices of young people prior to group sessions was obtained retrospectively.

- To assess how young people understood nutrition and key health issues after completion of group education sessions, 11 Focus Group Discussions (FGDs) were conducted with 110 adolescents. In all, 214 adolescents were asked to draw a nutritious food plate. Content analysis of number of food groups depicted in these drawings indicated their idea of a balanced diet. This evidence was corroborated through four FGDs conducted with parents. Except for one father, mostly mothers participated in the FGDs due to availability and owing to the perception that child care was their responsibility.
- A total of 19 mothers of adolescents diagnosed with and treated for anaemia were interviewed after treatment to assess their understanding of anaemia and their support to the treatment.
- Eight in-depth interviews (IDIs) and six FGDs with 41 young participants who volunteered to work on sanitation issues midway through the programme were conducted to understand their experiences.
- Following the programme initiated dialogue with the public health system, two clinical and one nonclinical staff from PHPs were interviewed regarding public health services for adolescents.
- Periodically throughout the programme, informal interaction with field staff provided data on the challenges faced when working with young people on change in dietary habits and anaemia treatment compliance.

### Data collection and analysis

To unravel how adolescents and their families understood anaemia, the researchers adopted an emic perspective (Pike, 1996). They tried to identify how the deprivations and challenges faced by young people and parents in urban slums shape their definitions of nutrition, anaemia and health.

Research participants from Dharavi, Kandivali and Kalwa were contacted through programme staff. FGDs and interviews were conducted mostly at programme centres in the community or at the workplaces of health workers. The FGDs and interviews lasted approximately 45 minutes each, were conducted in Hindi or Marathi, audio recorded and then translated and transcribed verbatim to English. Written consent from parents to gather evidence related to the programme interventions was sought at the time of enrolment of young people. Verbal consent of participants themselves was obtained during data collection for this study. Permission was sought before starting the audio recording and participants were assured of confidentiality. Data were subsequently anonymised. The FGDs with young people and parents were conducted separately.

All the raw data were sorted manually into categories based on similarities. Researchers (V.A. & N.S.) then assigned codes to these categories using inductive code development. They did so in several stages and iterations with input from the larger team. Emerging themes, as a result of this

exercise, were further clustered to delineate core themes aligned to the conceptual framework. A grounded theory approach (Charmaz, 2005) proved to be particularly helpful in distinguishing between contexts of gender-based discrimination and eating habits that varied across families.

Responses from young people on change in knowledge and behaviour were triangulated with data obtained from parents, while data from parents on mediators of anaemia treatment were triangulated with information from SNEHA and PHP staff.

# Findings

Anaemia testing of young people was conducted in batches, before and after treatment. In 2019, testing of 889 study participants (675 girls and 214 boys) revealed a 47% reduction in anaemia levels. While 49% adolescents were anaemic before treatment (24% mildly, 24% moderately and 1% severely anaemic), 26% remained anaemic after treatment (17% mildly, 9% moderately and <1% severely anaemic). Non-anaemic girls in the sample increased from 45% to 69%, while non-anaemic boys increased from 70% to 87% after treatment.

### Change in nutrition awareness and dietary practices of young people

Lack of awareness about nutrition prior to attending the sessions. Most young respondents mentioned that prior to group sessions, they had no awareness of nutrition and its effect on their bodies. They used to eat junk food like *vada pav* (potato cutlets fried in oil and stuffed inside refined flour buns) or *bhajias* (fritters deep fried in oil) very frequently. Such items were convenient, readily available and preferred by their friends. 'I had no idea about what to eat or how to cook', recalled a girl from Dharavi, while a boy from Kandivali stated, 'We mostly ate junk food outside with friends'. 'Lunch is not prepared at home by the time we leave for college; we get just this food in our canteen', said a young woman from Kalwa.

Reduction in junk food consumption after attending group sessions. A young boy from Kandivali admitted that 'earlier we had the habit of eating junk food several times a day but now we have reduced the frequency'. This sentiment was echoed by other participants. Most respondents were able to identify food items classified as junk or street food and became aware that low-quality ingredients, unhygienic and unhealthy cooking practices made food unhealthy. Parents corroborated these claims that their children now ate food (including green vegetables) prepared at home more often.

Before coming here, they would throw tantrums and demand *vada pav*. Now they understand that it is harmful for them. They have not completely given up eating street food, but the frequency has definitely reduced. (Parent, Kandivali)

Factors influencing effects of group education. Changes in eating habits were neither uniform nor permanent. Data collected a few months after the sessions found resurgence of old habits. Young people in Dharavi were eating more junk food than those in Kalwa and Kandivali, probably because the visibility and availability of street food was higher, making it harder for them to resist. Content analysis of participants' drawings of a 'nutritious food plate' depicted that less than 50% had drawn all the four food groups, indicating less than fair comprehension of the concept of a balanced diet. Boys – especially those in the younger age group (10–14 years) – showed little understanding of this concept, underlining the need to use methods that capture their interest and attention better. Follow-up sessions and refreshers were therefore conducted, and data obtained from participants attending these indicated healthier dietary practices. This demonstrated that for increased

effectiveness and sustained change, the programme needed to reinforce the messages periodically through repeated cycles of interventions. It was important to transmit congruent messages through different channels.

# Agency of young people leading to an enabling environment

*Increased awareness about nutrition.* Along with sessions with parents and community campaigns organised by the programme, participants themselves transferred messages to their families and friends triggering a process of change. A young boy from Dharavi recalled, 'One of my friends used to get stale food in her tiffin, resulting in diarrhoea. I convinced her mother to cook fresh food for her'. 'I have told my friends in school not to eat unhygienic street food', shared another from Kandivali.

Behaviour change within the family. Parents who were initially sceptical about letting their children participate in the programme, later admitted that it taught them about the adverse effects of junk food on physical health. They 'came to know what to eat and what not to eat', a mother from Kalwa expressed. Mothers, who struggled to cope with their workload and looked at junk food as an easy option, later reported increased efforts to provide fresh, home-cooked meals. They realised the extra work this entailed was compensated by improvement in their children's health and by financial benefits. 'Earlier I would give 10 rupees daily and the child would eat *vada pav* outside. Now with that money, we are making things at home and the entire family can eat enough', said one mother from Dharavi. Moreover, parents themselves gave up eating junk food, setting an example for their children, as mentioned by a parent from Kandivali who '. . . used to eat street food daily. I was almost addicted to it. After our children told us about the consequences, we stopped'.

*Improved personal and environmental hygiene.* Many participants, after attending sessions, reported making a conscious change to personal hygiene practices and in maintaining environmental hygiene. A young boy from Dharavi said, 'We were told that when we play, our hands get dirty. Now I wash my hands with soap before eating'. A girl from Kandivali mentioned how she

 $[\ldots]$  used to compete with my neighbour in throwing garbage on the street. After coming here, I not only stopped doing it but also started cleaning up after her, prompting her to stop as well.

Young volunteers reportedly learned about the proper channels to make local governance systems accountable for maintaining sanitation in their communities. A boy from Kandivali recounted, 'There was no one to teach us how and where to lodge a complaint regarding blocked drains and overflowing garbage bins. We learned this from SNEHA'. This was acknowledged by parents and appreciated by the wider community.

These little girls are going to a government office by themselves, speaking to them to improve sanitation in the community. This is a big thing, and we must support them. (Local political leader, Dharavi)

By the end of the programme cycle, young people had persuaded the government system to repair public toilet blocks and instal proper doors and lights to make them safer and accessible for women and children. They had managed to get fumigation done for mosquito control, got dumping grounds cleared, sewers cleaned and waste baskets installed in households.

*Initiating dialogue with public health system.* The programme's efforts to make the public health system adolescent friendly were fraught with challenges. There was frequent turnover among PHP personnel making communication difficult. Competing responsibilities encouraged the staff to attribute lower priority to adolescent-friendly services. The belief that their efforts were wasted on an undeserving population was evident during interactions with PHP staff. A frontline health worker in Kalwa said, 'most of my time goes in doing this paperwork' and a Dharavi-based medical officer rued that there was 'no response for the efforts I put in for these people. Whatever you do for them, they are not going to change!' However, the condescending attitude of the PHP staff towards the community thawed when presented with evidence of civic initiatives by young people to ensure better health and hygiene in the community. A previously intractable medical officer from a PHP in Dharavi became more amenable to initiate adolescent-friendly services after she came to know of these youth-led efforts.

### Environment influencing anaemia treatment

Noncompliance to treatment. The agency of young people fell short when it came to seeking treatment for anaemia. Those who were found to have anaemia had little self-motivation to continue with treatment. Although the side effects of the iron supplements were often cited as a reason for noncompliance, many discontinued treatment despite not experiencing these effects. They did not understand the consequences of anaemia, and were uninterested in the test results, as found in the response of an older girl in Dharavi, 'I don't know my Hb level; I have no interest in knowing'.

Parental support as an enabler. Parental support – mostly from mothers – was a major enabler for treatment compliance. When mothers ensured that the supplements were taken in the prescribed manner, side effects were fewer. Some mothers encouraged their children to continue treatment despite side effects. A mother in Kandivali said, '[I] told my daughter that the treatment is for your own good and encouraged her to continue with the medicine. After a few days the reaction stopped'. Support was forthcoming when parents realised the gravity of the condition and the importance of treatment compliance. A parent from Dharavi explained how

[my] elder daughter had to be hospitalised with severe anaemia. It was a harrowing experience. So, when my son was diagnosed with mild anaemia, I ensured that he had the supplements, and ate well.

When a private doctor approved of the supplement, parents encouraged the child to comply with treatment. A family in Dharavi recounted, 'When the tablets were given, we checked with a private doctor, who said that the tablets would benefit the child'.

Unfortunately, a private doctor was not always easy to reach. If programme staff failed to give detailed information about anaemia to the parents, they did not realise its gravity and appeared to think of it as a nuisance rather than a serious health hazard. Some parents from Kalwa, when asked about the consequences of anaemia, responded casually saying, 'this will lead to weakness, nothing else'. Such parents did not make any effort to monitor treatment.

*Importance of nutrition education.* Awareness about nutrition added value to parental support. The mother of a young person from Kandivali who became non-anaemic without supplements, stated, 'I was giving him a lot of green vegetables' (an affordable and culturally acceptable source of iron).

However, many mothers did not know what food could improve Hb levels. For some, a major takeaway from group education sessions was just the adverse effects of junk food. According to them, as long as food was prepared at home, it was healthy, irrespective of its nutritional value.

They were unaware that anaemia can cause a loss of appetite (Soliman et al., 2014) while reduced food intake leads to a lack of nutrients and further escalates anaemia. This lack of awareness sometimes made them blame their children for being poor and picky eaters.

In some households where children's Hb levels had improved after treatment, parents were unaware that improvements would not be sustained without proper nutritional support. A girl whose Hb levels had increased considerably, from 8.4 to 12.2 g/dL, after regular intake of supplements, was found to be eating noodles soaked in oily curry for lunch. The parents did not know that regular consumption of such food could make her anaemic again.

These findings draw attention to the need to revisit the content of messages delivered through group education and through nutrition counselling provided as part of the anaemia treatment.

Gender barriers. Observations emphasised the interplay between gender and anaemia or nutrition. In almost all the households, the onus of domestic labour including child care fell solely on the mother, who was also supplementing family income through home-based enterprises. Caring for a child with anaemia only added to her existing workload. When encouraged to play a more active role in anaemia treatment for her child, a mother in Dharavi said in exasperation, 'What all can we be doing?!'

Fathers, instead of participating in the process, practised non-interference at best. Sadly, in many cases they were found to overrule the mother's decisions about dietary choices. This derailed effort to instil dietary discipline in children. On one hand, parents pleaded helplessness to change dietary practices among pampered boys. On the other hand, the food preferences of men took precedence over nutritional requirements of girls in the family. 'We had a son after three daughters. My husband feels we should not deny him anything, including the fried food that he demands instead of green vegetables', confided a mother from Kandivali, while a parent from Dharavi admitted, 'My son eats only junk food, keeps pestering me for money to buy outside food. If I refuse, we are scared that the child may steal money or steal junk food'. A mother in Kandivali lamented that her 'daughter really likes spinach and demands it, but I rarely make it as my husband does not like it'.

Adolescents from families where mothers shouldered all the household responsibilities fared the worst. A widowed mother in Kandivali, in her struggle to survive, neither had means nor the time to prepare meals, 'Sometimes I just don't cook. My children do not eat then. Sometimes I make tea, and they dip biscuits in it, eat and sleep. They don't complain'. Another woman with an alcohol-dependent husband, exasperated by the demands of daily living, could not find time to hospitalise her severely anaemic daughter.

### Discussion

Findings from this study emphasise nutrition education as a crucial factor in promoting positive dietary practices. Once young people develop awareness about the adverse consequences of junk food, they can be persuaded to consume it less often. The repetition of information increases effectiveness and ensures sustained change. Findings suggest, however, that noncompliance with the treatment of anaemia among adolescents is a major challenge and to ensure treatment compliance, specific information on improving iron and Hb levels, along with awareness of the consequences of anaemia, is required.

Most nutrition-based programmes focus on the immediate determinants of anaemia (Malhotra et al., 2015). Our data underline the importance of more intermediate determinants such as access to health care as well as sanitation and hygiene. More importantly, the evidence underscores how socio-cultural norms within the environment constitute a critical determinant of anaemia.

Gendered barriers to nutrition and health care impose an excessive burden of care on mothers, leading to the neglect of daughters and the pampering of sons. In families where mothers were the sole breadwinners, poverty and food insecurity could affect the quality of care provided to adolescents. The present data underscore the urgency for interventions to tackle gender socialisation while dealing with nutritional issues of adolescents (Institute for Health Management, Pachod and International Center for Research on Women, 2001).

In line with studies encouraging the involvement of local stakeholders in the prevention of anaemia among adolescents (Malhotra et al., 2015; Vemuri et al., 2019), our data suggest a close relationship between an enabling environment and the health behaviour of young people. Parental support is vital in ensuring compliance to anaemia treatment as well as in improving dietary practices in the family. Adolescents can prove to be emissaries of information leading to better health and nutrition awareness among parents. While validation from community health practitioners can reinforce the messages given by anaemia interventions, the involvement of young people themselves holds promise to improve environmental sanitation and hygiene as well as to improve access to public health care.

The findings of this study signal scope for convergence with government programmes such as the *Rashtriya Kishor Swasthya Karyakram* (National Programme for Adolescent Health) which advocates for investment in peer education as a strategy to improve nutrition awareness and the practice of dietary diversity among young people (Government of India, 2014). Partnership with local government systems to create and maintain better sanitation facilities in vulnerable urban communities could also be explored.

A bigger challenge however is a complete lack of market regulation regarding the availability of junk food in India (Keshari and Mishra, 2016). As described above, easy access to junk food proves a huge temptation for young people. Collective advocacy is called for to recognise its connection to anaemia and therefore address it effectively.

#### Limitations

The programme has piloted various strategies to encourage anaemia testing among adolescents. In this article, we have reported results from the most recent test. Data collection was undertaken not long after the group education sessions were completed, hence the findings cannot be said to reflect long-term change. The recruitment of the participants was carried out by the programme staff, and although the broad criteria of age, gender and location were specified and met, the possibility of selection bias cannot be denied.

### Conclusion

Findings highlight the importance of a multi-pronged approach to address anaemia. Continued dissemination of information about nutrition and the consequences of anaemia are important to reduce treatment noncompliance and to improve iron and Hb levels. Future efforts to address adolescent anaemia should also take into consideration factors such as socioeconomic status, gender equity and health prioritisation. The family as a unit needs to be involved in behaviour change with a process where young people are not just passive recipients of services but are looked upon as agents of change. The ability to look at the interconnectedness of factors that aid and hinder anaemia reduction is key to combating this problem.

More studies similar to this one exploring the experiences of those addressed by nutrition and anaemia interventions are required to complement ongoing quantitative research in the field of anaemia reduction and to strengthen interventions. Further research is needed to evaluate the implementation of government schemes to reduce anaemia among adolescents to assess whether these large-scale programmes employ an approach that takes the wider environment into consideration.

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