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Programmes to Prevent Noncommunicable Diseases (NCDs) in India: Improving Healthy Eating for Adolescents

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India is facing a substantial rise in noncommunicable diseases (NCDs), many of which are caused by poor dietary habits early in life. This brief presents effective strategies to improve healthy eating among adolescents in India.

NCDs are diseases that are not caused by infection and are not transmitted through contact with a person. Nearly 2 out of 3 of all deaths in India are now due to NCDs. This is a significant increase over the past 30 years.¹

Also, the leading causes of death in India have shifted. In 1990, for example, diseases caused by diarrhoea and respiratory infections led to the most deaths. These are communicable diseases and spread from one person to another in a variety of ways. In 2016, two NCDs, heart disease and chronic obstructive pulmonary disease (COPD)—a disease that causes blocked airflow in the lungs—were the leading causes of death.² This shift from deaths caused by communicable diseases to deaths caused by NCDs has occurred in low- and middle-income countries, like India, where often there is little support for preventing and treating NCDs.³

NCDs affect people of all ages, and many risky behaviours, like smoking and unhealthy eating, are started or reinforced in adolescence. Impaired nutrition even during infancy increases the risk of NCDs later in life.⁴ Poor dietary habits, for example, are a big cause of NCDs such as diabetes and heart disease. This is a complex issue in India, because the country faces both the widespread lack of proper nutrition and obesity. With more than 14 million children who are obese, India is second only to China for the greatest number of obese children in the world.⁵

Effective science-based programmes are needed to combat risk factors, such as unhealthy diets, and ultimately improve poor health and reduce deaths related to NCDs. To help identify these programmes, we evaluated the most recent science and identified effective programmes to improve eating habits among adolescents in India.

Nearly
2 out of 3
of all deaths in
India are now
due to NCDs.¹

Our Methods and Findings

What studies did we review?

69
studies

We searched the scientific literature for peer-reviewed studies that met the following criteria:



Dates	Databases	Languages	Population	Keywords
January 2007– September 2017	<ul style="list-style-type: none"> PubMed Embase Web of Science CAB Abstracts IndMED Directory of Open Access Journals Google Scholar New York Academy of Medicine Grey Literature Database 	<ul style="list-style-type: none"> English Hindi 	Adolescents aged 13 to 24 in India	Adolescent/adolescence/ young adult/teenage AND India AND Intervention/program AND Prevention AND Obesity/overweight/ diabetes/heart disease OR diet/dietary habits/food intake/food consumption/ nutrition/eating/sodium/ fat/fruit/vegetable

32
studies

We graded the studies based on:

- the strength of the study design;
- if the study reasonably could be repeated using the same methods, different participants, and different researchers;
- whether the programme could be easily implemented in other contexts; and
- the impact of the programme on eating behaviours to help prevent NCDs.

9
studies

We identified cross-cutting themes in the programme components and found that:

- 9 studies had strong designs and showed results that improved adolescents' eating habits.

This brief presents findings and insights from these 9 studies.

What type of health education programmes did these studies use?

- All 9 studies used school-based health education programmes for middle school and/or high school students.
- These programmes were carried out in both public and private schools.
- The states where these studies took place include Tamil Nadu, Delhi, Karnataka, Haryana, and Chandigarh.

Who participated in these studies?

Average number of participants

580
(median: 302)



Age range of participants

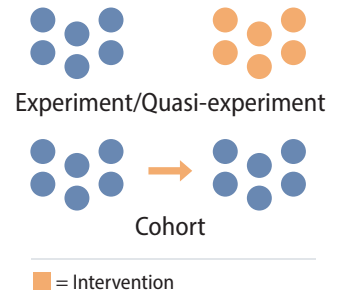
13–18
years old

What programme components did these studies use?

- Each programme had an educational component carried out in the classroom.
- Other components included engaging families, changing school policy (such as the types of foods allowed at meetings or events), changing the food environment (such as foods offered at the canteen), and engaging teachers.
- Programmes took place over 9 months on average (with a range from 3 to 30 months).

What study designs and methods did these studies use?

- **8 experimental/quasi-experimental studies:** One group of participants received the programme being studied while another group did not. In the four experimental studies, students or schools who received the intervention were randomly assigned. In the four quasi-experimental studies, the assignment of the intervention was not random.
- **1 cohort study:** In a cohort design, a particular group of people took part in the same programme and were observed over a specific time period.



What did these studies look at?

These studies looked at changes in participants’ beliefs, eating patterns, and body composition:

7
studies*

assessed knowledge, attitudes, and/or intentions to change eating behaviours

7
studies

assessed changes in eating patterns and food intake

4
studies

assessed changes in weight, body mass index (BMI), and other body changes (such as lowering cholesterol)

*These numbers do not total 9, as some studies looked at more than one component.

What did these studies find?

Of the 9 studies reviewed:

7
studies

found **positive changes** in knowledge, attitudes, and/or intentions

6
studies

found **positive changes** in eating patterns and food intake

2
studies

found **reductions** in weight and BMI, or improvements in other physical measures

Just 2 of the 9 programmes changed people’s weight, BMI, or other physical measures. This is most likely because the length of the programmes was short (on average, 9 months), and most only followed up with participants immediately after the programme. Using body changes as an outcome measure is challenging, as adolescents are still growing, and an upward shift in these measures is expected in this age group.

How We Can Apply the Study Findings

Because studies are not often designed to show which factors made the most difference, it can be difficult to figure out what made a programme effective. As such, we looked across the set of studies that showed positive changes for adolescents in India and tried to pull out the factors that most of these programmes had in common.

Tip! These programme components are not mutually exclusive. Rather, they should be used in conjunction and coordination with each other for maximum benefit. As demonstrated by the most effective programmes, a multicomponent approach is more promising for longer-term improvements in knowledge, attitudes, and behaviours.

“Since both undernutrition and overnutrition is associated with NCD burden, multicomponent, evidence-based, nutrition improvement programmes and interventions are the need of the hour. These interventions need to be implemented through a well-coordinated, multisectoral action plan at the country level in various health promotion settings to prevent NCDs.”

-Dr. Monika Arora
Executive Director, Health Related Information Dissemination Amongst Youth (HRIDAY) and Governing Board Member, Healthy India Alliance

Recommendations

Here are some important things to think about when developing healthy eating programmes for adolescents in India. To get the most benefit out of your programme, it's good to combine multiple components.

1. Use a programme design based on theory

One good approach is social cognitive theory.⁶ This theory says that learning happens within a social context that can influence a person's behaviours. This context includes external and internal factors, such as a person's neighbourhood, their education, and past experiences. Using a solid theory will help you evaluate how and why the programme works.

2. Conduct educational sessions with groups of adolescents

Offer group educational sessions to *all* adolescents in a community or school, rather than trying to reach individual adolescents at high risk and providing one-on-one counselling. Taking an approach that reaches a whole group may help make positive changes to the social norms and social support around healthy eating. In other words, if an adolescent's friends are all learning the same information about nutrition, they are more likely to reinforce that knowledge amongst themselves.

3. Prepare schools and staff to deliver the programme

Educate school staff on why eating healthy foods is important for adolescents, given the rise in NCDs in India. Encourage school staff to take ownership by providing them with tools and resources to help them carry out the programme on their own. For example, provide educational posters about healthy foods that they can hang up in the canteen.

4. Use multiple teaching techniques to engage adolescents

Adolescents' brains change and develop rapidly, and they are often distracted by other interests, such as friends, sports, or social media. To pique their interest and keep them engaged in education and counselling about good nutrition, use multimedia materials and activities, including films, flash cards, quizzes, computer-assisted tools, and competitions.

5. Make it easier for adolescents to choose healthy foods

Provide more nutritious food choices—such as fruits, vegetables, and dairy—in school canteens, homes, and neighbourhood shops. Change policies and the day-to-day environment to support behaviour changes. For instance, schools might choose not to sell unhealthy food in the school canteen. To overcome the cost barrier for some fruits and vegetables, try to get financial support from the government or nonprofit organisations for local produce.

6. Engage parents in nutrition education and behaviour change

Parents can be important teachers and role models about good nutrition and champions for eating a healthy diet. Involve parents early on with a school kickoff or parent-teaching event to describe your planned programme approach, educate them about the importance of preventing NCDs early in life, and encourage them to offer more fruits and vegetables at home and in their children's packed lunches. Consider sending educational materials, family assignments, or even healthy snacks home with students.

The information on each study is presented in Table 1.

Table 1. Characteristics of Effective School-Based Programmes to Address Adolescents' Eating Habits in India

	PROGRAMME								
	Anand, 2015 ⁷	Bakshi, 2012 ⁸	Kalpana, 2010 ⁹	Rani, 2012 ¹⁰	Saraf, 2015 ¹¹	Singhal, 2010 ¹²	Thakur, 2016 ¹³	Tiwari, 2011 ¹⁴	Ulavannavar, 2015 ¹⁵
COMPONENTS^a									
Theoretical Foundation	☑	☑		☑	☑	☑	☑		
Group Nutrition Education	☑	☑		☑	☑	☑	☑	☑	☑
Engagement of Teachers and Administrators					☑	☑	☑		
Multimedia Strategies		☑	☑		☑		☑		☑
Changes to the Food Environment					☑	☑	☑		
Family Involvement			☑		☑	☑	☑		
OUTCOMES^b									
Nutrition Knowledge	↗	↗	—	↗	↗	↗	—	↗	↗
Attitudes and Intentions towards Nutrition	↗	—	—	↗	—	↗	—	—	↗
Fruit and Vegetable Intake	↗	↗	—	↗	↗	↗	—	—	↗
Unhealthy Food Intake	—	—	—	↘	↘	↘	↘	—	↘
Biochemical Changes	—	—	—	—	—	↗	↗	→	—
Body Mass Indicators (BMI/Weight)	—	—	↗	—	—	→	↗	→	—

Table Legend

Intervention included	☑	No change	→	Not measured	—	Change	↗ ↘	Statistically significant change	↗ ↘
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^aProgramme Components

Theoretical Foundation: Use a theory, such as social cognitive theory, to guide programme design.
Group Nutrition Education: Provide lessons about diet and nutrition to an entire group of adolescent peers.
Engagement of Teachers and Administrators: Get buy-in from and include school staff in carrying out the programme.
Multimedia Strategies: Use innovative multimedia approaches (such as videos) and educational lectures.
Changes to the Food Environment: Change the food that is available in school, such as removing deep-fried foods from the canteen.
Family Involvement: Educate parents about healthy eating behaviours and provide resources to support healthy eating at home.

^bParticipant Outcomes

Nutrition Knowledge: Improve adolescents' understanding of good nutrition and diet, such as which foods are considered healthy.
Attitudes and Intentions towards Nutrition: Improve adolescents' positive perception of healthy eating and motivation to improve their eating habits.
Fruit and Vegetable Intake: Get adolescents to eat more fruits and vegetables during the programme period.
Unhealthy Food Intake: Get adolescents to eat fewer unhealthy foods, such as fried foods or chips, during the programme period.
Biochemical Changes: Improve adolescents' biochemical levels, such as lowering cholesterol levels.
Body Mass Indicators: Improve adolescents' physical body metrics, including weight, BMI, and circumference of body parts such as arms and waist.

Efforts by the Government of India

Midday Meal (MDM) Scheme

The Ministry of Human Resources Development, Government of India, is implementing a national programme called the Midday Meal Scheme in schools, with the goal of improving the nutritional status of children and increasing school attendance. This programme can be better utilized and planned to support the NCD agenda, as it can help form healthy food habits.¹⁶

Food Safety and Security Authority of India guidelines and programme

The Food Safety and Security Authority of India (FSSAI) has issued guidelines on HFSS foods (foods high in fat, sugar, and salt). These guidelines focus on specific nutrients, including fats and sugars, through more transparent and accessible nutritional labelling, taxation, and children's advertisement regulation.¹⁷ The FSSAI also has undertaken initiatives to ensure delivery of safe, nutritious, and healthy food for all citizens through its Safe and Nutritious Food (SNF) campaign. This programme is a nationwide campaign to help school children adopt the habit of eating safe and eating right at home, school, work, and dining venues.¹⁸

“Youth can have a major influence on their own food environment by demanding healthy and appealing food in their schools and homes, and they can use their social media skills to spread good habits about healthy eating amongst each other. They can cause a healthy food revolution.”

-Dr. Rachel Nugent
Vice President
Global Noncommunicable
Diseases
RTI International

Learnings from Other Countries

To broaden the scope of school-based programmes or expand programmes into other settings, here are some guidelines and recommendations on healthy eating programmes for adolescents based on leading agencies in the United States and Europe. These additional programme components might work well outside of the classroom, but they will need to be adapted to the Indian context.


Use peer educators and leaders

Adolescents often look to their peers for guidance and reinforcement. Use peer educators or leaders to help their friends choose fruits and vegetables when they are out, instead of choosing deep-fried foods. To sustain impact beyond the programme period, recruit and train peer leaders (both overweight and normal weight) to provide face-to-face support in making healthy food choices.¹⁹ In worksite programmes, engage managers and other company leaders to participate in challenges or competitions to help reinforce healthy behaviours.²⁰

Take nutrition education outside of the classroom

Help students apply theoretical concepts and curricula in more experiential ways, like growing a garden or reading and analysing nutrition labels. Also, expand nutrition education beyond health courses. For example, science teachers might add a lesson about macronutrients—carbohydrates, protein, and fat, which provide the bulk of energy for humans. Or teachers can add field trips to local farms for hands-on learning about food, nutrition, and healthy eating.²¹ Develop a programme outside of the school entirely by educating older adolescents and promoting healthier choices at worksites.²²

More than
19%
of children in India
are overweight or
obese.²⁶



Conduct early screening for obesity and poor diets in adolescents

The United States Preventive Services Task Force (USPSTF) recommends obesity screenings for children and adolescents ages 6 years or older.²³ However, more research needs to be done on nutritional screening for habits and biochemical markers, such as cholesterol level.²⁴ Once health risks or conditions are identified, the World Health Organization (WHO) recommends that health care providers offer diet counselling and referral as part of routine primary care.²⁵ These components might be included through India's National Adolescent Health Strategy, known as the Rashtriya Kishor Swasthya Karyakram (RKSK) programme, and its Adolescent-Friendly Health Clinic component.

Improve the environment where adolescents eat and play

As shown in the India-based programmes described in this brief, replacing unhealthy foods in the canteen with healthy foods can be an effective programme. However, sustaining this is challenging given the high cost of some fruits and vegetables as compared with packaged foods. As recommended by WHO and USPSTF, schools or businesses might utilize public food distribution to underwrite locally grown produce. The government might also provide incentives and awards to urban designers and organisations that make health a priority in how they build communities and school campuses, as part of their Smart Cities project.^{27,28}

Increase access to clean water

Increasing access to clean water in schools might support better nutrition and reduce rates of obesity and overweight in adolescents and NCDs later in life. This may be partly due to students replacing high-calorie, sugar-sweetened beverages, such as soda and juice, with water. The USPSTF recommends providing water fountains throughout schools, putting steps in place to ensure that water fountains are kept up, and allowing students to have water bottles in classes.³⁰ The US Centers for Disease Control and Prevention recommends making free water available to students during meal times.²¹

Harness the power of technology

More than 225 million Indians use the internet to search for information, enjoy online entertainment, and participate in social networking.^{31,32} Internet-based and other technology-based coaching or self-management programmes might help adolescents reduce weight and maintain weight loss.^{19,33}

Amplify messages by using social marketing and media campaigns

Use a mass media campaign on healthy diets, including social marketing strategies to reduce eating “bad” foods (such as sugar and salt) and promote eating “good” foods (such as fruits and vegetables).^{34,35} For instance, eliminate barriers to behaviour change in schools and workplaces by placing healthier foods where they are easy to select (such as at eye level), setting up attractive displays of produce, and offering taste tests of new menu items.^{21,35}

Utilize laws and policies for widespread impact

The national government, states, or specific schools might put in place school meal policies or requirements that ensure school breakfasts or lunches meet specific nutritional requirements, like India's Mid-Day Meal programme. Consider policies that require foods and beverages sold during the school day—such as in vending machines, food carts, and canteens—and those served during school celebrations and events to meet established nutritional guidelines.³⁵ Alternatively, schools could offer other items as rewards for healthy eating, such as extra time at recess or a note of recognition.²¹ These same policies could be used in worksites to improve diet and behaviours amongst adolescents in the workforce, such as offering healthy foods at company meetings.³⁶

45%
of youth ages
14 to 16 do not
eat any fruit on a
daily basis.²⁹



“Making our diets healthier is achievable, but to reverse the historical trend of increased obesity and ill-health among adolescents we need to see a variety of interventions. These will range from community or school-based programmes to government policy and regulation. Only through a multicomponent approach can we expect to see significant improvements in eating habits among adolescents in India.”

-Liam Sollis
PLAN International, UK

Push for private-sector change and support

Food labelling in India currently is not strongly regulated. The domestic and regional food industry might adopt their own set of best practices to show their social responsibility. To promote dietary education and informed choices, one approach might be to limit portion and package size to reduce calorie intake and the risk of overweight and obesity. Another approach might be to improve nutrition labelling of both packaged and prepared unpackaged foods to highlight calories, sugar, salt, and fat content.³⁴

Conclusion

In this review, no single programme was shown to be the most effective approach to dietary change in Indian adolescents. However, we identified 6 programme characteristics that appear to be effective in increasing knowledge, positive attitudes, and healthy eating habits, and in improving physical body indicators, such as BMI, waist measurement, and cholesterol level.

Overall, the best approach is to focus on creating an environment that supports positive knowledge, attitude, and behaviour change around healthy eating. This often leads to short-term and longer-term improvements in health and reduces NCD risk factors.

In general, strong evaluations and plans to sustain the programmes were missing from the programmes we evaluated. These are two key components to lasting success. Both activities should be included when designing and investing in your programme.

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Programmes
to Prevent
Noncommunicable
Diseases (NCDs)
in India:
Improving
Healthy Eating
for Adolescents

May 2018

RTI International's NCD Initiative

RTI International's Global Noncommunicable Disease Initiative is working with global partners and country leaders to design, implement, and evaluate interventions and long-term solutions to address NCDs. Together, we are helping country-level partners to:

- reduce premature mortality from NCDs;
- support the achievement of universal health coverage;
- strengthen health systems and responses to reduce harmful use of alcohol and tobacco; and
- improve access to essential medicines and treatments.

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