



Evidence Brief | August 2018

# Programs to Prevent Noncommunicable Diseases (NCDs) in Rwanda: Improving Healthy Eating for Adolescents and Adults

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In 2010, **25%** of Rwandan women in urban areas and **15%** in rural areas were overweight or obese.<sup>3</sup>

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Rwanda is facing a rise in noncommunicable diseases (NCDs). Poor diet is a top risk factor for NCDs. This brief presents effective strategies to improve eating habits for adolescents and adults in Rwanda.

Noncommunicable diseases, also known as chronic diseases, are diseases that are not caused by infection and not spread through contact with another person. NCDs include diabetes, heart disease, stroke, cancer, and chronic lung disease, among others. Together, they are the top cause of deaths worldwide.<sup>1</sup> In Rwanda, more than 1 in 3 of all deaths are caused by NCDs.<sup>2</sup>

Because of the rise of overweight and obesity in Rwanda—particularly in urban areas and among women<sup>3</sup>—NCDs related to diet need attention. This is a complex issue in Rwanda because the country faces widespread lack of proper nutrition. For example, in 2015, among Rwandans aged 15 to 64 years an estimated 14% were overweight and 3% were obese, whereas 8% were underweight.<sup>4</sup>

Unhealthy eating habits, which can increase the risk for NCDs, are common in Rwanda. For example, less than 1% of Rwandans eat five or more servings of fruit and/or vegetables per day.<sup>4</sup>

Effective, evidence-based programs that address risk factors for NCDs, such as unhealthy diets, are needed to reduce the number of NCD-related deaths. While the Ministry of Health of Rwanda recognizes the growing problem of NCDs, overweight and obesity, most nutrition-related programs and policies have focused on the lack of proper nutrition.<sup>3</sup> However, little research in Rwanda has examined improving eating habits to prevent NCDs. To help identify potentially effective programs that address healthy eating, we evaluated recent research on effective programs implemented in low- and middle-income countries (LMICs) that might also be effective with adolescents and adults in Rwanda.

## Our Methods and Findings

What studies did we review?

**54**  
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"> <li>PubMed</li> <li>Embase</li> <li>Web of Science</li> <li>CAB Abstracts</li> <li>Directory of Open Access Journals</li> <li>Google Scholar</li> <li>New York Academy of Medicine Grey Literature Database</li> </ul>	English	Adolescents and adults aged 13 or older living in LMICs	Adolescent/adolescence/ young adult/teenage <i>AND</i> Rwanda/low- and middle- income countries <i>AND</i> Policy/intervention/program <i>AND</i> Prevention <i>AND</i> Obesity/overweight/diabetes/ heart disease <i>OR</i> eating habit/diet/dietary habits/food intake/food consumption/nutrition/ eating/sodium/fat/fruit/ vegetable/sweetened beverage/dietary fat

**38**  
studies

*We graded the studies based on:*

- the impact of the program on eating behaviors to help prevent NCDs;
- the strength of the study design;
- whether the program could be easily implemented in Rwanda; and
- whether the study reasonably could be repeated using the same methods, different participants, and different researchers.

**12**  
studies

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

- 12 studies had strong designs and showed results that improved eating behaviors and/or body weight.

*This brief presents findings and insights from these 12 studies.*

What type of health behavior change programs did these studies use?

- The 12 studies used community-, workplace-, school-, and clinic-based programs for adolescents and adults.
- These studies were carried out in LMICs; namely Brazil, China, India, Iran, Kenya, Mexico, Pakistan, Spain,\* and Tonga. No studies that appeared in our search were conducted in Rwanda.

\*One study by Lana et al.<sup>5</sup> was conducted in Mexico and Spain, which is not considered an LMIC.

## Who participated in these studies?

Average number of participants  
**3,677**  
 (median: 2,238, range: 281 to 12,514)



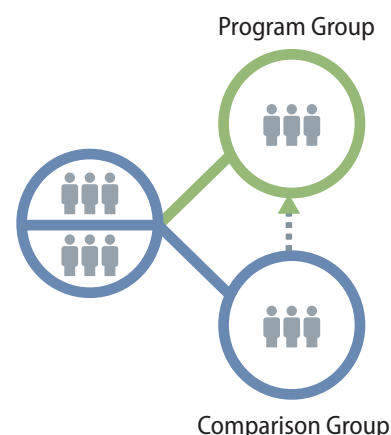
Age range of participants  
**13–75**  
 years old

## What program components did these studies use?

- Most of the programs had an awareness-raising, informational, or educational component, including eHealth and mHealth components and providing personalized information in some of the programs.
- Other components included changing policy, changing the food environment, and involving the community.
- Studies took place over 25 months on average (range: 4 to 60 months).

## What study designs and methods did these studies use?

All 12 studies were randomized or nonrandomized controlled trials. Participants were assigned to receive either (a) the program being studied or (b) a standard comparison program or no program. In 4 of the studies, participants were **randomly assigned** to one of these two groups. In 8 of the studies, they were not randomly assigned. Random assignment to groups is an important study design element that helps researchers be more confident that the program truly made a difference, when differences are found.



## What did these studies find?

Of the 12 studies reviewed:

**11**   
 studies

found **positive changes** in eating habits such as increased fruit and vegetable intake, reduced added salt, reduced sugar and fat intake, and dietary adherence.

**5**   
 studies

found **reductions** in body weight, body mass index (BMI), waist circumference, and/or obesity.

**4**   
 studies

found **positive changes** in other biochemical and clinical changes, such as blood sugar level and blood pressure.

## 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 program effective. Consequently, we looked across the set of studies that showed positive changes for adolescents and adults in LMICs and tried to pull out the factors that most of these programs had in common.

Information on each study is shown in Table 1.

**Table 1.** Characteristics of Effective Programs to Improve Eating Habits in Low- and Middle-Income Countries

	PROGRAM												
	Anthony et al. <sup>6</sup>	Baghaei et al. <sup>7</sup>	Fotu et al. <sup>8</sup>	Jaime et al. <sup>9</sup>	Kelishadi et al. <sup>10</sup>	Lana et al. <sup>5</sup>	Mohammadifard et al. <sup>11</sup>	Ram et al. <sup>12</sup>	Ramachandran et al. <sup>13</sup>	Sarrafzadegan et al. <sup>14</sup>	Shahid et al. <sup>15</sup>	Van de Vijver et al. <sup>16</sup>	
<b>STUDY POPULATION<sup>a</sup></b>													
Adolescents	☑		☑	☑	☑	☑	☑						
Adults	☑	☑		☑	☑		☑	☑	☑	☑	☑	☑	☑
<b>COMPONENTS<sup>b</sup></b>													
Theoretical foundation	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑			
Policy/environmental change	☑	☑	☑		☑		☑			☑			
Community involvement	☑	☑	☑		☑		☑			☑		☑	
eHealth and/or mHealth education				☑		☑		☑	☑		☑	☑	
Personalized information				☑				☑	☑		☑		
<b>OUTCOMES<sup>c</sup></b>													
Changes in eating habits	📈	📈	📈	—	📈	📈	📈	📈	📈	📈	📈	📈	📈
Body mass indicators	📈	—	📈	📈	—	📈	—	—	📈	—	—	—	—
Biochemical/clinical changes	—	—	—	—	—	—	—	📈	📈	—	📈	📈	📈

**Table Legend**

Intervention included	☑	Not measured	—	Change	📈	Statistically significant change	📈
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**<sup>a</sup>Study Population**

**Adolescents:** Individuals between 13 and 24 years of age  
**Adults:** Individuals over the age of 24

**<sup>b</sup>Program Components**

**Theoretical foundation:** To guide program design, use a theory such as social learning theory, social cognitive theory, or the Transtheoretical Model.  
**Policy/environmental change:** Include policies, guidelines, and/or supportive environments.  
**Community involvement:** Engage community members; community, workplace, school, or church leaders; and health workers when developing and carrying out the program.  
**eHealth and/or mHealth education:** Use text messages, telephone calls, e-mails, interactive software and/or websites to provide health education information and/or counseling.  
**Personalized information:** Provide information tailored to a specific person’s needs or characteristics, through individualized lifestyle counseling, customized information, or tailored feedback.

**<sup>c</sup>Participant Outcomes**

**Changes in eating habits:** Eating more healthy foods such as fruits and vegetables and less unhealthy foods such as sugar, fat/oil, and added salt.  
**Body mass indicators:** Reduced BMI, body weight, body fat, and waist circumference.  
**Biochemical/clinical changes:** Improved blood sugar level, insulin sensitivity, blood pressure, and cholesterol level.



*One strategy of the Rwanda National Food and Nutrition Policy includes preventing and managing all forms of malnutrition, increasing knowledge of the problems of nutrition-related NCDs, and developing and strengthening strategies to achieve these objectives.<sup>3</sup>*

## Recommendations

Here are some important things to think about when developing healthy eating programs in Rwanda, based in part on the articles we reviewed.

### **1. Use a multicomponent approach**

Using more than one component in your program, such as education combined with policy change, may help the components to reinforce each other. This may yield bigger and longer-term improvements than programs that only use one component.<sup>17</sup> For example, as part of a multicomponent workplace intervention, develop and display posters about healthy eating; display point-of-decision prompts in canteens; and distribute vegetable seeds and fertilizer and train employees on gardening.<sup>6</sup> Another example is combining weekly text-based messages with free access to a website that provides information (such as educational videos featuring peers, educational games, documents), access to an online community (such as forums, chat lines), and services (such as expert dietary advice after an analysis of an individual's food history).<sup>5</sup>

### **2. Use a program design based on theory**

Using a theory will help you anticipate how and why the program should work. For instance, the Transtheoretical Model<sup>18</sup> focuses on how people move through stages of readiness for making changes to their behavior, such as eating behavior. Programs based on this model develop educational and motivational materials for individuals that correspond to their stage of change for optimal influence. For example, two studies we reviewed (Ramachandran et al.<sup>13</sup>; Ram et al.<sup>12</sup>) provided male employees with tailored mobile phone text messages based on their stage of the Transtheoretical Model. Men in the precontemplation stage (who are not ready to change) may have received a message—such as “Eat healthy, be healthy, and be happy”—that corresponded with their need to be motivated to change. Men in the action stage (who have started making some changes) may have received a message—such as “Take fruits as a whole and not as a juice”—that corresponded with their need for more specific information about healthy eating. Based on the model, receiving messages matched to their stage can help individuals move through the pre-action stage to the action and maintenance stages.

### **3. Include policy and/or environmental change**

Changing policies and the day-to-day environment will help to support behavior change and make the healthy choice the easy choice. Support policy efforts that make it easier for everyone to access healthy and nutritious food in their community, school, or workplace. This could be done through creating school and community gardens, modifying food labels, and changing food offerings in canteens and restaurants, which were noted in the studies we reviewed.

### **4. Involve the community**

Involving community stakeholders—such as teachers, church leaders, or healthcare providers—will help to provide insights into programs that may work well in the community. This can play a critical role during program planning, implementation, and sustainability because these types of stakeholders can serve as role models and mobilize the community to change their eating habits. For example, through door-to-door visits in the slums of Nairobi, community health workers raised awareness about cardiovascular disease (CVD) prevention, measured CVD risk factors and provided brief counseling (as appropriate), and distributed vouchers for a free clinic visit.<sup>16</sup> In another

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*“As of June 2017, over 4 million people had internet service subscriptions, while over 8 million had mobile service subscriptions – 73% of Rwandans.”*

–Rwanda Utilities Regulatory Authority<sup>19</sup>

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example, heart health was promoted by training health workers and health volunteers on healthy eating habits using a train-the-trainer model facilitated by trained volunteers and health-related nongovernmental organizations.<sup>10</sup>

### 5. Incorporate eHealth and/or mHealth components

While evidence is still emerging on their effectiveness, eHealth and mHealth interventions offer great promise for behavior change because computers, mobile phones, and other mobile devices are widely accessible, relatively inexpensive, easy to use, and offer immediate delivery of the intervention. These interventions also allow for easy tailoring of the information to individuals based on personal information, such as providing individualized feedback and guidance on specific eating behavior challenges such as avoiding fat or including more fiber-rich food. In the studies we reviewed, the types of interventions ranged from phone calls to e-mails to text messages to websites to interactive programs.

### 6. Personalize the information

When information is presented in such a way that the content and presentation style match the characteristics and needs of specific individuals or groups, it can be more influential than standard information that is not tailored to the individual or group. For instance, in one study, participants received feedback on their individualized blood glucose readings and corresponding suggestions for changes to diet (and lifestyle in general).<sup>15</sup> Another study used interactive software to help employees monitor their weight loss and send them e-mail messages to promote health behavior changes that support healthy weight.<sup>9</sup>

## Conclusion

In our review, no single program was shown to be the most effective approach. However, all of the studies included multiple components, but they were not designed in a way that could determine which component made the most difference. Four studies reported on the same large community trial<sup>7,10,11,14</sup> and two studies reported on the same clinical trial.<sup>12,13</sup> While these studies made a difference, studies that included these components and showed success are not commonplace. Nonetheless, we identified 12 programs that used 6 approaches that appear to be effective in improving eating habits, body mass indicators (such as body weight and BMI), and biochemical/clinical changes (such as blood sugar level and blood pressure).

It is important to note that none of these studies were conducted in Rwanda. Consequently, it is critical that future research on effective healthy eating programs be conducted in-country. Publication of the findings will help inform evidence-based programs to prevent NCDs in Rwanda.

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## 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.

With 60 years of expertise in research, policy analysis and development, health economics and financing, on-the-ground project implementation, and strengthening health systems, RTI is an integral partner in both assessing and successfully addressing the economic and social impact of NCDs.

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### Learn More

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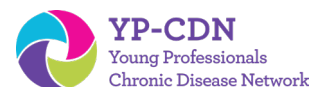
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