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The impact of nutrition standards for school meals on the diets of schoolchildren in Cambodia

Submission date
18/10/2023

Recruitment status
No longer recruiting

Registration date
30/10/2023

Overall study status
Completed

Last Edited
02/09/2026

Condition category
Nutritional, Metabolic, Endocrine

[_] Prospectively registered
[X] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Developing and implementing robust nutrition standards to ensure that meal composition is adequate for the nutrition requirements of targeted students has been identified as a key need for the school meal programme in Cambodia. The proposed study is embedded within a project that is currently developing a methodology for countries to set context-specific and data-driven nutrition standards for their school meal programmes. The project is implemented by the Food and Agriculture Organization of the United Nations (FAO) and the World Food Programme (WFP). The study aims to assess the effects of school meals that comply with robust nutrition standards on the diet outcomes of schoolchildren when compared to usual school meals.

Who can participate?
Children aged 9-11 years (at the time of baseline) enrolled in selected schools in Cambodia, who do not have any food allergies or intolerances

What does the study involve?
Schools are randomly allocated to an intervention group, where school meals will be prepared according to nutrition standards, or a control group, where students will receive their regular school meals. Dietary assessments are collected from children aged 9-11 years old at the start of the study and at the end of the intervention period of about 3 months.

What are the possible benefits and risks of participating?
There are no foreseen risks for the participating children. Children in the control group will continue to receive their usual school meals, while children in intervention schools will receive school meals that are nutritionally adequate for their context, preferences and needs.

Where is the study run from?
1. Food and Agriculture Organization of the United Nations (Rome and Cambodia)
2. Helen Keller International (Cambodia)

When is the study starting and how long is it expected to run for?
July 2022 to September 2024

Who is funding the study?
Federal Ministry of Food and Agriculture (Germany)

Who is the main contact?
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Contact information

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Scientific, Principal investigator

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Study information

Scientific Title

A cluster randomized trial to assess the impact of school meals compliant with nutrition standards on the diet quality of Cambodian schoolchildren

Study objectives
School meals that comply with context-specific and evidence-based nutrition standards have better diet quality outcomes than school meal that do not follow nutrition standards

Ethics approval required
Ethics approval required

Ethics approval(s)
1. Approved 27/02/2023, Cambodia Ministry of Health's National Ethics Committee for Health Research (80 Samdach Penn Nouth Blvrd (289), Sangkat Boeung Kok 2, Khan Tuol Kork, Phnom Penh, 120408, Cambodia; +855 (0)12 528789; nouthsarida@gmail.com), ref: N 061 NECHR

2. Approved 30/04/2024, Cambodia Ministry of Health's National Ethics Committee for Health Research (80 Samdach Penn Nouth Blvrd (289), Sangkat Boeung Kok 2, Khan Tuol Kork, Phnom Penh, 120408, Cambodia; +855 (0)12 528789; nouthsarida@gmail.com), ref: N 087 NECHR

Primary study design
Interventional

Study design
Cluster randomized controlled trial with two parallel group design with a 1:1 allocation ratio and with randomization at school level

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Diet modification

Interventions
Current interventions as of 18/03/2024:

All children from 40 selected schools (according to pre-defined criteria) in three regions in Cambodia will be randomly allocated to an intervention arm or to a control arm (1:1 ratio) using covariate constrained randomization. The schools assigned to the intervention will receive school meals prepared according to robust nutrition standards as a substitute for their usual school meals as well as a complementary food education strategy, while control schools will continue to receive their usual school meals. The intervention will last for 3 months and the meals will be prepared by the usual school cooks. Dietary measures have been collected from 20 randomly selected eligible children in each of the 40 schools at baseline (before allocation) and will be repeated at the end of the intervention period.

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Previous interventions:

All children from 40 selected schools (according to pre-defined criteria) in three regions in Cambodia will be stratified and randomly allocated to an intervention arm or to a control arm (1:

1 ratio) using pair matching. The schools assigned to the intervention will receive school meals prepared according to robust nutrition standards as a substitute for their usual school meals, while control schools will continue to receive their usual school meals. The intervention will last for 3 months and the meals will be prepared by the usual school cooks. Dietary measures have been collected from 20 randomly selected eligible children in each of the 40 schools at baseline (before allocation) and will be repeated at the end of the intervention period.

Intervention Type
Other

Primary outcome(s)
Current primary outcome measure as of 19/08/2024:

1. Differences from baseline between treatment arms at the endline in habitual daily intake (grams) of fruits; vegetables; meat, poultry, fish and eggs; and snack foods rich in salt, sugar and fat (including sugar-sweetened beverages, processed salty foods, grain-based and other sweets)

Previous primary outcome measure as of 18/03/2024 to 19/08/2024:

1. Differences between treatment arms at endline in habitual daily intake (grams) of fruits; vegetables; meat, poultry, fish and eggs; and snack foods rich in salt, sugar and fat (including sugar sweetened beverages, processed salty foods, grain-based and other sweets)

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Previous primary outcome measure:

1. Daily consumed grams of total fruits, total vegetables, animal source foods, and snack foods, measured via 24-hour recall at baseline and the end of the intervention period
2. Contribution of school meals to daily consumed grams of fruits, vegetables, animal source foods and legumes and snack foods, measured via 24-hour recall and weighed food record at baseline and the end of the intervention period
3. Dietary diversity scores, measured via 24-hour recall at baseline and the end of the intervention period

Key secondary outcome(s)
Current secondary outcome measures as of 19/08/2024:

1. Differences from baseline between the two treatment arms at the endline in usual energy (kcal) intake and estimated habitual daily intake and prevalence of inadequacy of protein (grams), fibre (grams), vitamin A (micrograms), vitamin C (milligrams), calcium (milligrams), iron (milligrams) and zinc (milligrams).
2. Differences from baseline between the two treatment arms at the endline in usual intake (grams) of fruits, vegetables; meat, poultry, fish and eggs; and snack foods rich in salt, sugar and fat, obtained from the home diet (i.e. excluding the school meal).

Other outcomes
3. Difference between the two treatment arms at the endline in weighed total mean plate waste from school meals
4. Difference between the two treatment arms at the endline in mean proportion of weighed plate waste relative to total served meal weight
5. Differences between the two treatment arms at three intervention points (once every month

of the intervention) in mean hedonic ratings of meal liking.
6. School-level adherence to the prescribed menus, calculated as the average number of compliance days in each intervention school during the three-month period
7. Dose received of the intervention, calculated as the average number of days in which children in each intervention school received the meals during the three-month period
8. Main implementation barriers and enablers in intervention schools identified at post-intervention

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Previous secondary outcome measures as of 18/03/2024 to 19/08/2024:

1. Differences between the two treatment arms at endline in mean energy (kcal) and estimated habitual daily intake of protein (grams), fibre (grams), vitamin A (micrograms), vitamin C (milligrams), calcium (milligrams), iron (milligrams) and zinc (milligrams).
2. Differences between the two treatment arms at endline in mean intake (grams) of fruits, vegetables; meat, poultry, fish and eggs; and snack foods rich in salt, sugar and fat, obtained from the home diet (i.e. excluding the school meal).

Other outcomes
3. Difference between the two treatment arms at endline in weighed total mean plate waste from school meals
4. Difference between the two treatment arms at endline in mean proportion of weighed plate waste relative to total served meal weight
5. Differences between the two treatment arms at three intervention points (once every month of the intervention) in mean hedonic ratings of meal liking.
6. School-level adherence to the prescribed menus, calculated as the average number of compliance days in each intervention school during the three-month period
7. Dose received of the intervention, calculated as the average number of days in which children in each intervention school received the meals during the three-month period
8. Main implementation barriers and enablers in intervention schools identified at post-intervention

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Previous secondary outcome measures:

1. Estimated mean daily intake of energy, protein, saturated fat, sugar, fibre, vitamin A, iron and zinc, measured via 24-hour recall (repeated in a subsample) at baseline and the end of the intervention period
2. Contribution of school meals to daily estimated intake of energy, protein, saturated fat, sugar, fibre, vitamin A, iron and zinc, measured via 24-hour recall (repeated in a subsample) and weighed food records at baseline and the end of the intervention period

Completion date
30/09/2024

Eligibility

Key inclusion criteria

1. Students aged 9 to 11 years old from the selected schools
2. Students receiving school meals

Participant type(s)
Learner/student

Healthy volunteers allowed
No

Age group
Child

Lower age limit
9 Years

Upper age limit
11 Years

Sex
All

Total final enrolment
800

Key exclusion criteria
1. Students with grave intolerances or food allergies
2. Students with health conditions that may affect their food consumption

Date of first enrolment
15/03/2023

Date of final enrolment
10/06/2023

Locations

Countries of recruitment
Cambodia

Study participating centre
Kampong Chhnang selected schools
Kampong Tralach
Kampong Chhnang
Cambodia
040201

Study participating centre
Pursat selected schools
Bakan and Kandieng
Pursat
Cambodia
150301 and 150201

Study participating centre
Oddar Meanchey selected schools
Samrong
Oddar Meanchey
Cambodia
240501

Sponsor information

Organisation
Food and Agriculture Organization of the United Nations

ROR
https://ror.org/00pe0tf51

Funder(s)

Funder type
Government

Funder Name
Bundesministerium für Ernährung und Landwirtschaft

Alternative Name(s)
Federal Ministry of Food and Agriculture, Federal Ministry of Food and Agriculture (Germany), Federal Ministry of Food and Agriculture's (BMEL), BMEL

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
Germany

Results and Publications

Individual participant data (IPD) sharing plan

Data obtained will be coded to avoid any potential loss of confidentiality. All potentially sensitive findings will be reported in a way that they cannot be traced to any individual.
All raw and processed datasets will be stored in a non-publicly available FAO repository.
Some of the dietary datasets generated during and/or analyzed during the current study will be made available in the FAO/WHO GIFT platform (which collects data sets on individual food consumption).

IPD sharing plan summary

Stored in non-publicly available repository, Stored in publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol (preprint)		10/09/2024	02/09/2026	No	No