Improving nutrition outcomes of school-age children by feeding an egg per day through a multi-sectorial collaboration approach in Ethiopia, Kenya, and Tanzania

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October, 2023

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Acronyms and Abbreviations

AFD	Agence Française de Développement
BMI	Body Mass Index
EPHI	Ethiopian Public Health Institute
FFQ	Food Frequency Questionnaire
GHI	Global Hunger Index
Hb	Hemoglobin
IQ	Intelligence quotient
Kg	Kilo Grams
ILRI	International Livestock Research Institute
m^2	Square Meters
MNM	Micronutrient malnutrition
RCT	Random control trial
RPM	Ravens Progressive Matrices
SD (σ)	Standard Deviations
WB	World Bank
WHO	World Health Organization
WISC	Wechsler Intelligence Scale for Children

Summary

Introduction: Malnutrition remains one of the most important causes of mortality worldwide and continues priority public health problems in low and middle-income countries. Micronutrient malnutrition (MNM) is widespread in the world including in the developing regions. Deficiencies in micronutrients like vitamin A, selenium, zinc, and iron can lead to a range of health problems including impaired growth, increased susceptibility to infections, anemia, poor cognitive function, and even blindness. Previous studies in Ethiopia showed that the micronutrient deficiencies are increasing. School feeding program (SFP) could address all forms of malnutrition, including stunting among children. However, the quality of school meal should be improved to address al energy and nutrient requirements. This study aims to provide evidences in improving dietary quality of school meals.

Objective: To assess the effect of daily consumption of egg on micronutrient status, cognitive development and school performance of school children in Ethiopia, Kenya and Tanzania.

Methodology: The study will use cluster randomized controlled trial (RCT) design to evaluate the effectiveness of egg supplementation. The treatment group will receive one egg per day for the duration of an academic year during school hours, while the control group will not. The study will be conducted in three pre-selected primary schools in Addis Ababa, Sidama, and Oromia regions. Eight seven students will be selected per school using a systematic random sampling. Dietary intake will be measured using 24-hour dietary recall and while micronutrient status will be measured from blood samples, from both intervention and control groups before and after intervention.

Expected Benefits: This study is expected to identify effective modalities for improving the quality of school meals and reducing malnutrition among school age children. This project also contributes to school performance and overall economic and social development of the current and future generations. The project may also be scaled up at the national level depending on the outcomes of this research, which may greatly benefit the school children.

1 Background and Justification

Malnutrition remains one of the most important causes of mortality worldwide and continues priority public health problems in low and middle-income countries (WHO, 2022). Infants, children, adolescents and women are most affected in which a significant burden is experienced among the under-five population (Unicef/WHO, 2021; WHO, 2022). The prevalence of malnutrition in school-age children is a global concern. Malnutrition can lead to poor academic performance, impaired cognitive development, and increased risk of illness and disease. Inadequate food intake, poor dietary diversity, and micronutrient deficiencies are common causes of malnutrition in school-age children (WHO, 2022). According to EPHI (2023), in Ethiopia, stunting, underweight, and wasting are prevalent among 39%, 22%, and 11% of the young children, respectively. Thinness affects 13.1% of male children and adolescents aged 5-19 years, while overweight is more prevalent among females (14.3%).

Micronutrient malnutrition (MNM) is widespread in the world including in the developing regions. Essential micronutrients such as vitamin A, zinc, selenium, and iron are crucial for the growth and development of children (WHO/FAO, 2006). These nutrients play important roles in maintaining healthy vision, immune function, skin health, cognitive function, and growth. Deficiencies in these micronutrients can lead to a range of health problems including impaired growth, increased susceptibility to infections, anemia, poor cognitive function, and even blindness (Muntau et al., 2002; Roberts et al., 2022; WHO, 2011). According to previous surveys conducted in Ethiopia, there is a high prevalence of deficiencies in important micronutrients such as anemia (25.8%), vitamin A (10.9%), and zinc (36%) (EPHI, 2016).

School feeding program (SFP) could address all forms of malnutrition, including stunting among children (WFP, 2018b). The benefits of such programs are manifold, as they are considered education interventions that not only improve nutrition and promote health but also facilitate access to education, increase attendance, retention rates, and school enrolment (MUTIMURA, 2019; WFP, 2018b). Facilitating inclusive and equitable quality education and overcoming gender disparities in primary and secondary education alongside Eradicating extreme poverty and hunger is central to sustainable development goal (IISD, 2016). SFPs have been proven to have a significant impact on improving children's access to education and completion of school cycles,

as well as reducing early marriages and street living, and promoting primary healthcare, nutrition, and environmental health (WFP, 2018b). Additionally, these programs can address multiple dimensions of poverty and deprivation in the long term by increasing household and community income (FAO&WFP, 2018). Families also benefit from the program as the value of school meals is equivalent to approximately 10% of their household income, resulting in substantial savings (WFP, 2019).

Since 2018, Ethiopia has implemented a school feeding program in government schools in the capital city, with plans to expand the program to other regions. The national school feeding policy framework aims to provide safe and nutritious meals to all pre-primary and primary school children by 2030. The school feeding program is also integrated into various policies, strategies, and programs, including social protection and the food and nutrition policy of Ethiopia (MOH, 2012; WFP, 2018a). The key challenges facing Ethiopia's food system in promoting healthy diets and nutrition include low dietary diversity, insufficient amounts of protein, vitamin A, and zinc, and poor dietary quality (Gebru et al., 2018). Implementing a school feeding program offers a crucial opportunity to improve diets and health of schoolchildren (Haney et al., 2023).

Home Grown school feeding programs (HGSF) are important for improving the nutrition and health of students, as well as for developing sustainable local and national food systems. These programs can identify policy and investment opportunities to promote nutrition-sensitive interventions in the food value chain. Additionally, linking school feeding programs to local production and development increases community involvement and support, which is vital for long-term program sustainability (WFP, 2018b, 2018a). The school meal menu in Ethiopia is dominantly cereal based with low diversity in food items. According to a previous national survey report EPHI (2013), the consumption of animal source foods like meat and eggs is very low even though Ethiopian FBDG recommended about 60 g/day (MOH/EPHI, 2022). According to Ethiopian FCT update (2023) egg is a good source of nutrients such as protein, vitamin A, selenium, zinc, and iron. This this study aims to generate evidence on the nutritional benefits of consuming one egg per day for school children.

2 Objective

2.1 General objective

- To assess the effect of daily egg feeding program on the nutritional status of school-age children in Ethiopia by implementing a aiming to reduce malnutrition, support cognitive development, and contribute to better educational outcomes.

2.2 Specific objectives

- To describe the nutritional status, the dietary intake, anthropometry, biochemical, and cognitive status of children 6 to 12 years of age in three selected primary schools.
- To assess the effect of providing an egg per day to school-age children on Micronutrient and amino acids status.
- The assess the effect of providing an egg per day to school-age children on cognitive and school performance.
- To promote the scalable chicken farm for integrating poultry product consumption in Ethiopian schools.

3 Methodology

3.1 Study design

The study will use cluster randomized controlled trial (RCT) design to evaluate the effectiveness of provision of egg feeding at schools. The study participants will be randomly assigned at the school level in each study area to either a treatment group or a control group. The treatment group will receive one egg per day during breakfast time for the duration of an academic year during school hours, while the control group will not receive any intervention. Sanitation education and deworming treatment will be given for both arms. The treatment group will be visited daily to record attendance and monitor egg intake. The study will measure the changes in the levels of vitamin A and selenium as primary outcomes, while school performance, cognitive skill, growth, serum zinc, and serum iron will be measured as secondary outcomes.

3.2 Study area and period

The study will be conducted in Ethiopia, specifically at three primary schools: Bilichita primary school in Addis Ababa (Arada sub-city), Murancho Kutela in Hawassa Zuria (Sidama region), and Kelecho Gebriel in Sendafa Zuria (Oromia region). In Kenya at Manera primary school and in Tanzania in Nyangawo village in Ruangwa district at Nandagala primary school. The research will last one academic year and will examine the scalability of incorporating egg supplementation into the existing feeding program.

3.3 Study Participants

The study will focus on children aged 6- 12 years who are attending primary school in the study areas.

3.3.1 Exclusion criteria

The school age children who have a chronic disease or an egg allergy will be excluded from the study.

3.4 Sample Size and Sampling Techniques

3.4.1 Sample Size

The study aims to measure the change in the primary outcome variables which are serum retinol (vitamin A) and serum selenium (selenium status) as a continuous variable. The sample size calculations considered to estimate adequate sample size in a fixed clusters randomized control trial study design.

To determine the required sample size for a CRCT with a pre-specified power 1-β, significance level (α), effect size (d), intra cluster correlation (ICC) (ρ), and individuals within each cluster/size of cluster (m), then the required sample size n_c=km per arm,

$$n_c = \frac{\left(z_{1-\alpha/2}+z_{1-\beta}\right)^2 * 2\sigma^2}{d^2}[1+(m-1)\rho]$$……(Rutterford et al., 2015)

Where n_1 is the sample size required under individual randomization per arm

$$n_1 = \frac{\left(z_{1-\alpha/2}+z_{1-\beta}\right)^2 * 2\sigma^2}{d^2}$$

For a trial with a fixed number of equal sized clusters (k) the required number of individuals in each of the k equally sized clusters is m:

$$m = \frac{n_1(1-\rho)}{k-n_1\rho}$$……..(Hemming et al., 2017)

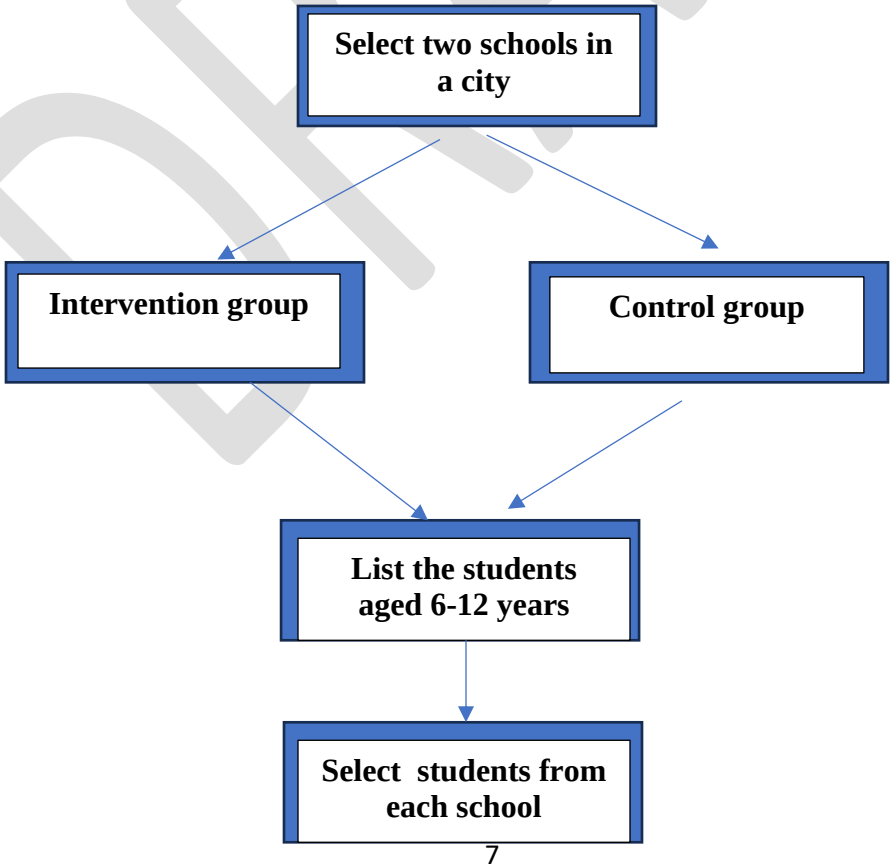
In this study, the significance level (α) was set to 5%, power (1-β) to 80%, effect size (d) to 0.15, ICC (ρ) to 0.001, cluster size per arm (k) to 3, and loss to follow up of 10%. Based on this information, In Ethiopia the number of individuals per cluster was calculated to be 87, resulting in 261 individuals per arm. Consequently, the total sample size was determined to be 522. And in Kenya and Tanzania the exact number of sample size is not determined hence the project will start the research in January 2024 and the number of children can be maximize or less. Once we obtain the exact number of children, we will use the same sampling techniques and principle.

For Ethiopia, A feasibility check was conducted to assess whether the fixed number of available clusters (k=3) would be sufficient to detect the required difference (effect size = 0.15) with the

desired statistical power (80%). The condition to ensure that the number of clusters per arm is adequate to detect the required effect size is that $n_1\rho$ should be less than k ($k > n_1\rho$), (Hemming et al., 2017). Upon calculation, $n_1\rho$ was found to be 0.144, which is less than the number of clusters per arm (k=3). As a result, the number of clusters is considered sufficient to detect the required effect size.

3.4.2 Sampling Techniques

School will be randomly assigned to intervention and control arms. We will collect the list of all student records from each school and exclude children who are not between 6-12 years old. In Ethiopia From each school, we will select 87 children using systematic random sampling. We will take the selected students' household information (where the household is located) from the children and school administration. We will obtain consent from the household head for dietary and biomarker data collection. We will collect sociodemographic and 24-hour dietary recall data at the household, while weight, height, blood, and stool samples will be collected at schools. The baseline data collection will be undertaken before commencing the intervention, whereas the end-line data collection will be collected at the end of the academic year.



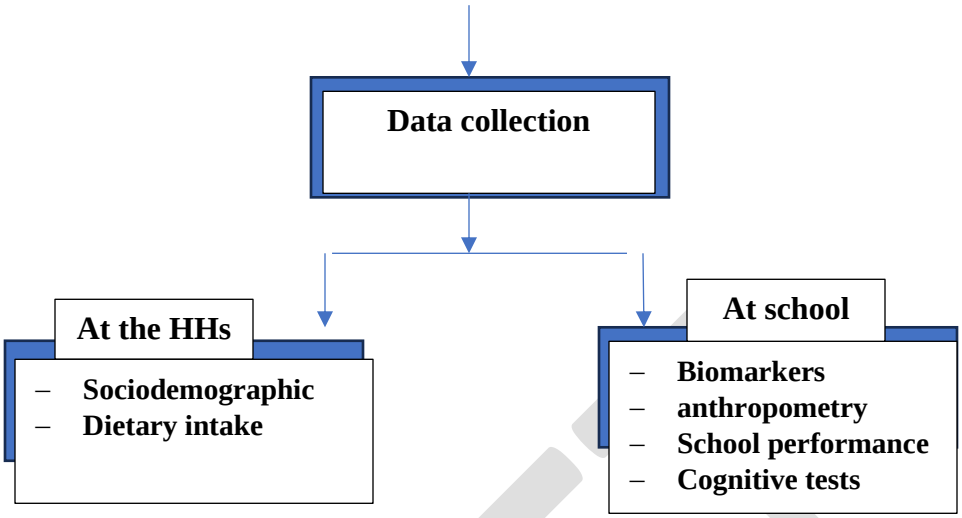


Figure 1: Sampling processes

3.5 Establish a chicken farm

TPGS (Tropical Poultry Genetic Solution) will construct chicken houses in the intervention group in order to develop and test a scalable model for integrating poultry product consumption in the school feeding program. The farms will be planned to base in the school compounds located as much as possible far from student teaching and playing grounds. ILRI's engineering units designed the chicken houses following a side open house structure, allowing for proper airflow and making them suitable for small land areas. The construction design will be intentionally developed to enable easy replication and expansion into other schools. The chicken house is planned to hold 1200-layer chickens. Consequently, with proper management, chickens on this farm naturally lay eggs on a daily basis, and some can even lay an egg every other day. Therefore, it is estimated that this farm will produce approximately 1000 eggs daily, which will be sufficient to feed 500-1000 children in each school. The school's administration will sell the leftover eggs collected during weekends and holidays. The money generated from these sales will be used to buy chicken feed, medicine, and other essential items.

Each intervention school will have professionals assigned by ILRI who will be in charge of managing the chickens and eggs. These professionals will ensure proper management and sanitation of the chickens, including vaccination and medication. In addition to this, an egg cooker and attendance taker will be assigned to ensure that there is proper follow-up on egg consumption. The eggs collected from the farm will be given to the cooker, who will boil them and feed them to the children.

3.6 Data collection procedures

The study will collect information on the socio-demographic characteristics of school-age children and their household's information. The study will also collect blood, stool, anthropometry, dietary consumption pattern using 24-hour data method. School performance, and cognitive status of school age children 6-12 years as mentioned in the following sections.

3.6.1 Biological Samples Collection Procedure

Venous blood samples will be taken from the control and intervention groups during both baseline and endline data collection times. Hemoglobin levels of children will be measured from venous blood while blood samples are collected on the spot. From the serum sample, primary outcomes such as vitamin A and selenium and secondary outcomes such as zinc, ferritin, soluble transferrin receptor (sTfR), alpha (1)- acid glycoprotein (AGP), high-sensitivity C reactive protein (hsCRP), and amino acids will be measured. Stool samples will also be collected to analyze the parasites test using a microscope. The following sections provide details on sample collection, storage, and lab analysis.

3.6.1.1 Blood sample collection procedure and analysis

We will collect venous blood samples, ranging from 5 to 7 mL, using vacutainer tubes and adhering to the established standard procedures set by the World Health Organization (2020). To collect blood reserved for trace metal analysis, we will use trace mineral-free vacutainer tubes. Once collected, blood samples will be allowed to clot for 30 minutes in cold boxes maintained at temperatures below 8°C. Following this, the samples will be centrifuged at a speed of 3,000 rpm for 10 minutes. The resulting separated serum will be aliquoted and stored in portable freezers set at -20°C within the field. These samples will later be transported to EPHI lab and preserved at -

80°C until the time of analysis. In the field, we will measure hemoglobin using the Hemocue (Hb 301) device.

The laboratory analysis for the serum ferritin, soluble transferrin receptor (sTfR), alpha (1)- acid glycoprotein (AGP), and high-sensitivity C reactive protein (hsCRP) will be measured using Cobas 6000 analyzer (Roche, Germany). Serum zinc will be measured in mass plasma atomic emission spectroscopy (MPAES) instrument and serum retinol will be measured in high performance liquid chromatography.

3.6.1.2 Stool Sample Collection and Analysis

Stool (should cover ¼ of the stool cup) samples will be collected using stool cups and stored in 10% formalin to preserve the parasite until analysis. A portion of each stool sample will be used to detect direct ova, larvae and cysts of intestine parasites using formal ether concentration technique.

3.6.2 Anthropometric Measurements

Anthropometric measurements, such as weight and height will be taken for the study's target populations using standardized procedures (WHO/UNICIEF, 2019). Weight-for-age, weight-for-height, and height-for-age z-scores are anthropometric indices. The WHO 2006 child growth standards and the WHO 2007 child growth reference data will be used to calculate the z- scores and BMI- for- age z- scores. The main anthropometric outcomes of interest will be stunting (length/height-for-age z-scores below 2 SD), wasting (weight for height z-scores below 2 SD), underweight (weight for age z-scores below 2 SD), thinness (BMI for age z-scores below 2 SD), and BMI.

3.6.3 Dietary intake and consumption patterns

We will evaluate the dietary intake patterns of school-aged children (6-12 years) by using multiple-pass 24-hour recall method. The diet quality indicators will also be calculated from the 24-hour dietary recall data.

3.6.3.1 Quantitative Multiple-pass Dietary Recall Method

We will measure the dietary intake of children aged 6-12 years by conducting a one-day quantitative multiple-pass 24-hour recall. This interactive interview consists of four steps designed to enhance memory recall and will proportionately represent all days of the week during the dietary

data collection to account for the day of the week effects on food intake. To account for the day-to-day variability of dietary intake within individuals, a second non-consecutive day 24-hour recall (repeat) will be collected (within 2–10 days of the first recall) on a randomly selected subsample of children. We will gather detailed non-standard recipe ingredient data for all mixed dishes prepared at home.

To evaluate the dietary intakes of school age children aged 6-12 years, we will use 15 food groups, including: (1) Cereals and their products, (2) Starchy roots and tubers, and their products, (3) Pulses and their products, (4) Vegetables and their products, (5) Fruits and their products, (6) Meat and poultry their products, (7) Eggs and their products, (8) Fish, shellfish and their products, (9) Milk and milk products, (10) Fats and oils, (11) Nuts and seeds, (12) Sugar and sweetened products, (13) Beverages, (14) Spices and condiments, and (15) Miscellaneous.

The first step will be creating a comprehensive list of food items, mixed dishes, and ingredients that are likely to be consumed by the study's target groups. To accomplish this, we will use the food lists from the 2021/22 national food and nutrition strategies baseline survey conducted by EPHI. Additionally, we will preselect portion size estimation methods appropriate for our studies, ensuring that they align with intake recommendations for use in the survey. Direct measurement of the actual foods consumed, standard unit measurements of size and quantity, and proxy measurements using play dough, water, rice, and maize flour will be the methods used to estimate the portion size. For each food on the food list, a specific method for estimating portion sizes will be used.

3.6.4 Cognitive test

The cognitive skills will be evaluated using Ravens Progressive Matrices (RPM) and Digits Reverse methods as mentioned in module III in the annex. In the RPM method the respondents will be asked to show a square with a specific pattern. Each square has a gap. They will be given a number of possible pictures. They will choose the picture that would fit in the gap and follows the pattern of the square. In the Digits reverse method, the enumerators will read some numbers to the study participants. And they will ask the respondents to repeat them back to them in reverse order. Using the data using both methods, the ability of school age children on lateral thinking,

learning new concepts quickly, and solving new and complex problems without drawing on prior knowledge will be evaluated.

3.6.5 School performance

The potential impact of daily egg supplementation on academic performance will be evaluated over the course of one academic year. The school coordinators in both the intervention and control groups will be requested to provide the students' school scores for both semesters. The variance in academic scores between the intervention and control groups will be evaluated.

3.7 Study Outcomes

The primary outcome of the study will be Micronutrient status, Vitamin A measured by serum retinol and selenium status measured by serum selenium. The study has several secondary outcomes, growth (HAZ), serum zinc, Iron status, nutrients adequacy, cognitive function and school performance.

3.8 Data analysis plan

For categorical variables, descriptive analysis will be used to calculate frequencies and percentages, as well as summary statistics such as means, medians, standard deviations (SD), and interquartile ranges (IQR) for continuous variables. The primary analysis will be in the intention-to-treat analyses and we shall also conduct per protocol analysis. For analysis of micronutrients status, we will use the Biomarkers Reflecting Inflammation and Nutrition Determinants of Anemia (BRINDA) methods to adjust for inflammation when examining the status of all micronutrients, using the biomarkers C-reactive protein (CRP) and alpha-1-glycoprotein (AGP). All data analyses will be conducted using STATA version 16 software.

3.9 Ethical Considerations

The study protocol will receive approval from the EPHI's Institutional Review Board from Ethiopia and Kenya National Commission for Science, Technology and Innovation (NACOSTI). Written informed consent will be obtained from the household head. Upholding the confidentiality of all collected data will be a top priority throughout each stage of handling information. Personal details of participants, including their names and other identifying information, will be kept

private, and data sets will be anonymized for analysis purposes. Furthermore, the study will be registered in Clinical trials.gov.

3.10 Communication and dissemination of study findings

The findings of the study will be disseminated through various communication methods, such as workshops held within the country, presentations at pertinent national and international scientific conferences, and technical reports. We will communicate to food and nutrition implementing sectors as well as to ministry of education to inform an option on improving school feeding program. Furthermore, the findings will undergo submission for publication in peer-reviewed journals.

4 Strengths and limitations of the study

The major strengths of this study are listed as follows:

- Rigorous cluster randomized control design: all individuals within a cluster receive the same treatment to reduce contamination.
- One academic year follow-up period to provide a more complete picture of the long-term effects of egg on the nutritional benefits of children.
- Cost effective: the schools will use eggs produced in their school compound.
- Innovative approach: support home grown school feeding program by providing locally produced eggs.

The study has limitation, such as potential imbalance in baseline characteristics between clusters, potential for selection bias. It has also a budget limitation.

5 Implementation Plan

Table 1: Project implementation plan for Ethiopia

Activities	2023						2024								
	April	May-June	Jul	Aug	Sep-Oct.	Nov - Dec.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Construct chicken house in the school compound															
Insertion of chicken at laying point into the constructed chicken house															
comprehensive plan that includes the timetable, personnel, necessary equipment, transportation, etc. For all study activities.															
Prepare and Submit proposal to EPHI IRB															
Preparation of questionnaires and tools															
Baseline work															
Recruitment of enumerators and supervisors															
Enumerators and supervisors training															
Pilot testing															
Conduct data collection															

Endline work															
Enumerators and supervisors' refreshment training															
Conduct data collection															
Biological samples laboratory analysis															
Data analysis and report writing															
Result Dissemination															

Table2: Project implementation plan for Kenya and Tanzania

Activities	**2023**			**2024**									**2025**	
	Jul-Aug	**Sep-Oct.**	**Nov-Dec.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul-Aug**	**Sep-Oct**	**Nov-Dec**	**Jan**	**Feb.**
Construct chicken house in the school compound														
Insertion of chicken at laying point into the constructed chicken house														
comprehensive plan that includes the timetable, personnel, necessary equipment, transportation, etc. For all														

study activities.														
Prepare and Submit proposal to EPHI IRB														
Preparation of questionnaires and tools														
Baseline work														
Recruitment of enumerators and supervisors														
Enumerators and supervisors training														
Pilot testing														
Conduct data collection														
Endline work														
Enumerators and supervisors' refreshment training														
Conduct data collection														
Biological samples laboratory analysis														
Data analysis and report writing														

Result Dissemination												

7 Benefits of the study results

This study is expected to identify effective modalities for improving the quality of school meals and may contribute in reducing malnutrition among school age children. This project also contributes to school performance and overall economic and social development of the current and future generations. The project may also be scaled up at the national level depending on the outcomes of this research, which may greatly benefit the school children. The study can be used as a guide when developing targeted interventions to deal with particular nutritional problems in children. Furthermore, the findings can help policymakers allocate funds wisely and invest in simple, inexpensive initiatives that significantly enhance the health and wellbeing of school-age children.

10 Declaration of conflict of interest

We authors do not have conflict of interest to declare.

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12 Assumptions, risks, and mitigation actions

Assumptions:

- School-age children in Ethiopia are suffering from malnutrition, which is affecting their cognitive development and educational outcomes.
- A daily egg feeding program will effectively improve the nutritional status of these children.
- Chicken farming can be scaled up at a reasonable cost to meet the demand of eggs required for the program.
- The data collected on nutritional status, dietary intake, anthropometry, biochemical, and cognitive status will be accurate and reliable.

Risks:

- Cultural or religious barriers to consuming eggs among the target population.
- Potential allergies or other health-related concerns among the children consuming the eggs.
- Difficulties in accurately measuring the impact of the program on the nutritional and cognitive outcomes of the children, due to confounding factors or biased data.

Mitigations:

- Implement a comprehensive monitoring system that regularly tracks the quality of the eggs provided.
- Collaborate with schools on screening for possible allergies and providing alternatives for children with known egg allergies.
- Enhance the validity and reliability of the data by using standardized methods and tools, including a control group for comparison.

13 Assurance of the principal investigator

I the undersigned agree to accept responsibilities for:

- The scientific, ethical, and technical conduct of the research project,
- Requesting amendment for any change on the protocol that might need to happen during execution of the project, and obtain written approval for the request from EPHI-IRB,
- Submitting progress report every year and technical report within two months after completion of the project,
- Reporting any adverse event that might happen to the study participants, data collectors, supervisors and coordinators during investigation,
- Submitting scientific publications that emanate from the project within two months of publication, and
- Reporting any unprecedented protocol violation within seven days of event. if the project is approved as a result of this application.
- Submitting your raw cleaned data to EPHI data management Center after writing the final report

Name __Tsion Yemane ----- Signature _____  **_____Date** -_ July 2023_____

14 Commitment for and Signature of Co-investigators

Name	Specific Roles and Responsibilities	Signature
Tsion Yemane	Protocol Development, Data collection, Data Analysis, and report writing	
Nahom Tefera	Protocol Development, Data collection, Data Analysis, and report writing	
Dr. Tadelle	Overall coordinator	
Tadesse Kebede	Protocol Development, Data collection, Data Analysis, and report writing	
Meseret W/yohannes	Protocol Development, Data collection, Data Analysis, and report writing	
Mulugeta Geremew	Protocol development and Data analysis	
Dr. Getachew Tolera	Overall coordinator	
Dr. Mesay Hailu	Overall coordinator	
Dr. Masresha Tessema	Overall coordinator, Protocol development, Document Reviewer	

15 Comment and concurrence of the responsible head for principal investigator

_____

_____

_____

Name_____Signature_____Date_____

16 Appendices

Appendix A. Informed Consent Form

You are being invited to take part in this research because you are either a mother or caregiver who has a school-age child. Among children 6 – 12 years, we would like to find out more about how well they are and collect a sample of your child's weight, height, dietary information, blood, and stool. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please read through the following information carefully and feel free to ask if it is not clear or to discuss it with anyone you wish.

Please take time to decide whether or not you want to take part in this research. We would like to stress that taking part in this study is entirely voluntary (**Box 1**).

Box 1. Taking part in this research is voluntary

- You **can refuse** to take part in this study.
- You **can withdraw** your participation from the study at any time

Information related to the study

We are conducting a research study to improve the quality of school feeding meals to reduce malnutrition. According to EPHI (2023), in Ethiopia, stunting, underweight, and wasting are prevalent among 39%, 22%, and 11% of the young children, respectively. To combat malnutrition, Ethiopian government is commencing school feeding program in some parts of a country. The school feeding program evaluation reports shows that the school meals serving at school still needs improvement in complementing with macro and micro-nutrients. This study is planned to improve the school meals by giving one egg for children as it is a good source of energy and nutrients. Your child is randomly assigned in intervention/control group. The study participants in the intervention

group will receive one boiled egg per day for one academic year during school times whereas the control group will not receive any intervention.

The study will be undertaken in 3 regions at 6 preselected schools. 24-hour dietary recall, weight, height, blood sample, and stool samples will be taken from your child during the beginning and ending of the academic year. The finding will contribute to adding different modalities in improving the quality of school feeding with in the available resources.

The expected possible adverse effects of
▪ There are no side effects from participating in this study

The objective of this research: to enhance the nutritional status of school-age children in Ethiopia by implementing a daily egg feeding program aiming to reduce malnutrition, support cognitive development, and contribute to better educational outcomes.

Study design
A cluster randomized control trial

Foreseeable risks and expected benefits arising from participation in the study	
Foreseeable risks	**Expected benefits**
Risks to study participants for involvement in this study are low. There may be risks associated with children with egg allergy. Interviewers will be trained to minimize this risk and will exclude children with egg allergy.	This study is expected to identify effective modalities for improving the quality of school meals and reducing malnutrition among school age children.
Occurrences that may take place during the study period	
Occurrences	**How to manage**
Withdrawal of volunteers from the study	In such a case, we would respect the volunteer's decision to withdraw and also get a clear understanding of the reason for their withdrawal

At the end of the study, you will not be receiving any financial benefits, but will get your child results for height, weight, and anemia status for time you spent and participation. All data collected from the study will be kept confidential. The information that we collect from the discussions will be kept private. Any information about your child will have a number on it instead of your child name (for example, Household #1). Only the project team will know what your number is and that information will be stored in a locked filing cabinet. Presentations of the study's results at meetings/conferences or their publication in a scientific journal will not include your name. If you have any questions related to the study you may contact directly Mr. Nahom Tefera who is the project principal investigator.

The contact persons
1. Tsion Yemane Tel. [+251 922591319] E-mail: [T.Yemane@cgiar.org]

Certificate of consent

Certificate of Consent	
I have read the foregoing information. I have an opportunity to ask questions and all my quest have been answered to my satisfaction. I volunteer give consent to participate in this research study _____ Printed name of the participant _____	I confirm that the participant was given an opportunity to ask questions about the study and all questions have been answered correctly. I confirm that the consent has been given voluntarily _____ Printed name of the person taking the consent

Signature of the participant Date _____ day/month/year	_____ Signature of the person taking the consent Date _____ day/month/year

Appendix B. Questionnaires

Module 1: Household identifier, characteristics and sociodemographic status

Household identifier and characteristics			
101.	Household Head Unique Code	|__|__| |__|__|__|__|__| GPS Coordinates	
102.	What is your age in years?	|__|__|	
103.	What is your marital status?	1= Married or living together 2 = Divorced/Separated 3 = Widowed 4 = Never Married and never lived together	|__|__|
104.	Has (NAME) ever attended school?	1= Yes 0=No →**Skip to 107**	|__|__|
105.	What is the highest level of school (NAME) has attended?	0 = Early childhood education Program 1. Primary 2. Secondary 3. Technical/Vocational 4. Higher	|__|__|
106.	What is the highest grade (NAME) completed at that level? 00= if less than one year completed 98= don't know	GRADE/YEARS] ☐☐	|__|__|
107.	What is your religion? **MULTIPLE RESPONSE IS POSSIBLE**	1= Orthodox 2= Muslim 3= Protestant/ other Christian 4= Catholic	|__|__|

		5=Traditional 98= don't know 99=Other_____	
108.	Do you own this house?	1 = Yes 0 = No	|__|
109.	Household size?	|__||__|	
110.	Observe main material of the **exterior** walls of the dwelling. **RECORD OBSERVATION**	**Natural Walls** 1= No Walls 2= Cane/Palm/Trunks 3= Dirt **Rudimentary Walls** 4**=** Bamboo With Mud 5= Stone With Mud 6= Uncovered Adobe 7= Plywood 8= Cardboard 9= Reused Wood **Finished Walls** 10**=** Cement 11= Stone with Lime/Cement 12= Bricks 13= Cement Blocks 14= Covered Adobe 15= Wood Planks/Shingles 99= other (specify) _____	|__||__|
111.	Observe main material of the floor of the dwelling. **RECORD OBSERVATION**	1 = earth/sand/dung 2= wood planks 3= /palm/bamboo 4= Parquet or polished wood 5= Vinyl or asphalt strips 6= Ceramic tiles 7= Cement 8= Carpet 99 = Other	|__||__|
112.	Observe main material of the roof of the dwelling. **RECORD OBSERVATION**	1= No roof 2= Thatch/palm leaf 3= Sod 4= Rustic mat 5= Palm/bamboo 6= Wood planks 7= Cardboard8= Metal 9= Wood 10= Calamine/cement fiber 11= Ceramic tiles 12= Cement 13= Roofing shingles 99= Other	|__||__|
113.	In your household, what type of cook stove is mainly used for cooking?	1= Electric Stove →**Skip to 119**	|__||__|

		2= Solar Cooker →**Skip to 119** 3= Liquefied Petroleum Gas →**Skip to 119** 4= Cooking Gas Stove →**Skip to 119** 5= Piped Natural Gas Stove →**Skip to 119** 6= Biogas Stove 7= Liquid Fuel Stove →**Skip to 117** 8= Manufactured Solid Fuel Stove 9= Traditional Solid Fuel Stove 10= Three Stone Stove/Open Fire 11= No food cooked in household →**Skip to 121** 99= Other _____→**Skip to 117**	
114.	Does the stove have a chimney?	1= Yes 0= No 98= Don't know	
115.	Does the stove have a fan?	1= Yes 0= No 98= Don't know	
116.	What type of fuel or energy source is used in this cook stove?	1= Alcohol/Ethanol 2= Gasoline/Diesel 3= Kerosene/Paraffin 4= Coal/Lignite 5= Ch rcoal 6= Wood 7= Straw/Shrubs/Grass 8= Agricultural Crop 9= Animal Dung/Waste 10= Processed Biomass (Pellets) or Woodchips 11= Garbage/Plastic 12= Sawdust 99= Other (Specify)_____	|__||__|
117.	What type of fuel or energy does your household mainly use for cooking in the absence of the main source?	1= Electricity 2= Piped natural gas 3= Solar air heater 4= Liquefied petroleum gas (LPG)/ 5= Cooking gas	|__||__|

		6= Biogas 7= Alcohol/ethanol 8= Gasoline/diesel 9= Kerosene/paraffin 10= Coal/lignite 11= Charcoal 12= Wood 13= Straw/shrubs/grass 14= Agricultural crop 15= Animal dung/waste 16= Processed biomass (pellets) or woodchips 17= Garbage/plastic 18= Sawdust 99 = Other (specify)	
118.	Is the cooking usually done in the house, in a separate building, or outdoors?	1= In the House 2= In A Separate Building **→skip to 121** 3= Outdoors**→skip to 121** 99= Other ____**→skip to 121**	|__||__|
119.	Do you have a separate room which is used as a kitchen?	1= Yes 0= No	|__||__|
120.	At night, what does your household mainly use to lighting the home?	1= Electricity 2= Solar lantern 3= Rechargeable flashlight, torch or lantern 4= Battery powered flashlight, torc or lantern 5= Biogas lamp 6= Gasoline lamp 7= Kerosene or paraffin lamp 8= Charcoal 9= Wood 10= Straw/shrubs/grass 11= Agricultural crop 12= Animal dung/waste 13= Oil lamp 14= Candle 15= No lightening in the household 99= Other (specify)	|__||__|
121.	At night, what does your household use to lighting the home in the absence of the main means?	1= Electricity 2= Solar lantern	|__||__|

		3= Rechargeable flashlight, torch or lantern 4= Battery powered flashlight, torch or lantern = Biogas lamp 6= Gasoline lamp 7= Kerosene or paraffin lamp 8= Charcoal 9= Wood 10= Straw/shrubs/grass 11= Agricultural crop 12= Animal dung/waste 13= Oil lamp 14= Candle 15= No lighting in the household 99= Other (specify)	
122.	How often does anyone smoke inside your house?	1 = Daily 2 = Weekly 3 = Monthly 4 = Less once monthly 5 = Never	|__||__|
123.	Is the house connected to electricity?	1 = Yes 0 = No	|__||__|
124.	Does your household have: A. Electricity B. Radio C. Television D. A non-mobile-telephone E. A computer F. A refrigerator G. Table, H. Chair I. Sofa J. Bed, K. Cupboard, or Cabinet)	1 = Yes 0 = No |__||__|	
125.	In total, how many of the following items are owned by residents of this household?	A watch A kerosene lamp/pressure lamp	|__||__|

126.	**Add the household total for each item**	Mobile phone	|__||__|
127.		Cart	|__||__|
128.		Bicycle	|__||__|
129.		Motorcycle, Bajaj or motor scooter?	|__||__|
130.		An animal-drawn cart?	|__||__|
131.		A car or truck?	|__||__|
132.		A boat with a motor?	|__||__|
133.		Car/tractor	|__||__|

Module 2: 24-hour Dietary Recall Questionnaire

Note for the data collectors: Among the household members, this module questionnaire is to be filled for the child 6-12 years of age in the household.

Part 1: Household identifier and basic information

24-hour dietary recall

School code |__|__|__| Household code |__|__| Child ID |__|__||__|

Unique ID Child: |__|__|__|__|__|__|__|__|

Interview Date: Date - _ _/_ _/_ _ _ _ **Day -** 01=Mon 02=Tue 03=Wed 04=Thu 05=Fri 06=Sat 07=Sun

Date of food intake - _ _/_ _/_ _ _ _

	Question	**Coding category**	**skip**
1.	Enumerator Code:	_____	
2.	For which target group is the recall being done?	0. Child	
3.	Recall number	0. Recall 1 1. Recall 2	
4.	Name of the woman interviewed	_____	
5.	Age of the woman (in complete years)	Age in years (_____)	
6.	Name of child	_____	

7	Date of birth (DOB): Use Ethiopian calendar	|__|__|/|__|__|/20|__|__|	
8.	Age of the child (in complete years)	_____years	
9.	Child's sex:	0=Male 1= Female	
10.	Food weighing scale number:	|__|__|	
11.	Was yesterday's food intake different from your usual diet?	1=Yes 0=No	No →13
12.	If yes,	1=Holyday/celebration 2=I was sick 3=Other	
13.	Was [child name] yesterday's food intake different from your usual diet?	1=Yes 0=No	No →15
14.	If yes,	1=Holyday/celebration 2=I was sick 3=Other	
15.	Did you take medicine/supplement yesterday?	1=Yes 0=No ***If yes, name:*** _____	
16.	Did [child name] take medicine/supplement yesterday?	1=Yes 0=No ***If yes, name:***_____	

Procedures to collect the required information

1. **Pass 1: list all foods and drinks consumed during the 24-hour period.**
   Now I would like to ask you about the foods and drinks that [YOU/ YOUR CHILD] consumed yesterday from the time you work up until you went to sleep, sunrise yesterday to sunrise today. Please list all foods or drinks you ate, weather you ate or drank them at home or somewhere else. Please think about snacks and small meals as well as main meals.

   1) "WHAT WAS THE FIRST THING [you/ your child] ATE YESTERDAY AFTER SUNRISE?"
   2) "WHEN WAS THAT"
   3) "DID [you/your child] HAVE ANYTHING WITH THAT?
   4) "WHAT DID [you/he/she] HAVE?"
   5) "WHAT IS THE NEXT THING [you/ your child] ATE OR DRANK AND WHEN WAS THAT?"
   6) REPEAT questions 3-5 until you have a full record for both DAY AND NIGHT
      a. The reference period is from sunrise yesterday to sunrise this morning. If they wake up at a different time than sunrise, you can use the time from waking up yesterday until waking up today

2. **Pass 2: get more detail about each food**.
   7) "NOW, PLEASE DESCRIBE EACH FOOD [you/ your child] ATE YESTERDAY"
   8) "WHAT TYPE WAS IT?"
   9) "WHERE DID YOU GET IT?"
   10) "WHAT ARE THE INGREDIENTS?"
      a. Use standard "probes" (probing questions) to get these details for each food.
   11) "HOW MUCH DID THIS RECIPE MAKE?" or "WHAT WAS THE TOTAL AMOUNT THIS MADE?"
   12) "HOW WAS The Recipe PREPARED?"
      a. Identify the cooking methods used (particularly if raw, fermented, or fried in oil).

3. **Pass 3: estimate the amount consumed of each food on the list**

   13) "HOW MUCH OF [name the first food] DID [you/ your child] CONSUME?"
      a. Help the mother remember and **estimate the amount** of each food or recipe that her child ate and that she herself ate.

   14) "WAS ANY LEFT OVER?"
      a. If any food is leftover from what the mother served to the child, enter that amount.

   15) "PLEASE HELP ME ESTIMATE THE AMOUNT OF FOOD YOU ATE OR USED IN THE RECIPE"

Use following portion size estimation method to estimate the amount of food/ingredient eaten or used in a recipe 1. Direct weight (g) 2.Proxy weight (g) 3. Water (g) 4. Number 5. Other (specify).

4. **Pass 4: verify everything consumed**
    a. Quickly read the information back to the respondent, “HAVE I FORGOTTEN TO ADD ANYTHING?”

Part 2. <u>Quick list</u>

Pass 1

Please describe the foods the foods and drinks that [YOU/ YOUR CHILD] consumed yesterday from the time you work up until you went to sleep (sunrise yesterday to sunrise today). Please list all foods or drinks you ate, weather you ate or drank them at home or somewhere else. Please think about snacks and small meals as well as main meals.

Write down all foods and drinks mentioned. When composite dishes are mentioned, ask for the list of ingredients

When the respondent has finished, probe for meals and snacks not mentioned.

Early morning	Mid-morning	Noon	Afternoon	Evening	Late evening

Food No.	What was the first thing [YOU/ YOUR CHILD] ate or drank after sunrise yesterday? Anything else?	Time of meal	Please describe this food / beverage/ ingredient:	How was this prepared?	Place of preparation	How was the food / Ing. measured	Amount served	Amount left over	Amount eaten	Recipe information			
										State of each ingredient	Cooking method of the recipe	Total amount of recipe prepared	Links to food/ recipes
1													
	Ingredient:		Description										
					NA								
					NA								
					NA								
					NA								
					NA								
2	Ingredient:		Description										
					NA								
					NA								
					NA								
					NA								
					NA								
3	Ingredient:		Description										
					NA								
					NA								
					NA								
					NA								
					NA								

Time of meal: 1. Early morning 2. Mid-Morning 3. Noon 4. Afternoon 5. Evening 6. Late evening

Place of preparation: 1. Home 2. Outside home

How was it prepared: 1=raw/ no change/ as purchased; 2=fermented; 3=fried; 04=cooked or boiled – wet heat; 5=baked/ grilled/ broiled – dry heat; 6=local miller; 7=blanched (dipped in boiling water); 8=other

Food No.	What was the first thing [YOU/ YOUR CHILD] ate or drank after sunrise yesterday? Any else?	Time of meal	Please describe this food / beverage/ ingredient:	How was this prepared?	Place of preparation	How was the food / Ing. measured	Amount served	Amount left over	Amount eaten	Recipe information			
										State of each ingredient	Cooking method of the recipe	Total amount of recipe prepared	Links to food/ recipes
1													
	Ingredient:		Description										
					NA								
					NA								
					NA								
					NA								
					NA								
2	Ingredient:		Description										
					NA								
					NA								
					NA								
					NA								
					NA								
3	Ingredient:		Description										
					NA								
					NA								
					NA								
					NA								
					NA								

Time of meal: 1. Early morning 2. Mid-Morning 3. Noon 4. Afternoon 5. Evening 6. Late evening

Place of preparation: 1. Home 2. Outside home

How was it prepared: 1=raw/ no change/ as purchased; 2=fermented; 3=fried; 04=cooked or boiled – wet heat; 5=baked/ grilled/ broiled – dry heat; 6=local miller; 7=blanched (dipped in boiling water); 8=other

Module 2 (Amharic version): የአመጋገብ ግምገማ መጠይቅ

ለመረጃ ሰብሳቢዎች ማስታወሻ: ከቤተሰቡ አባላት መካከል ፤ ይህ ክፍል በቤተሰቡ ውስጥ ላሉ ከ አምስት አመት በታች የሆኑ ህፃናት እና በመውለድ እድሜ ክልል ውስጥ ላሉ ሴቶች የሚሞላ ነው::

ክፍል 1. የቤተሰብ መለያ እና መሰረታዊ መረጃ

የ24-የአመጋገብ ግምገማ			
የጥናት ቀጠን ቁጥር |__|__|__| የቡተሰብ መ.ቁ |__|__| ተራ ቁትር |__|__| የህጻን ቁ. |__|__| የእናት መ.ቁ.: |__|__|__|__|__|__|__| ልዩ የህጻን መ.ቁ. |__|__|__|__|__|__|__|__|__| ቃለ መጠይቁ የተደረገበት ቀን: ቀን: _ _/_ _/_ _ _ እለት: 01=ሰኞ 02=ማክ 03=እሮብ 04=ሀሙስ 05=አርብ 06=ቅዳሜ 07=እሁድ ምግብየተበላበት ቀን - _ _/_ _/_			
	ጥያቄ	አማራጮች	የሚዘለል
17.	ለጥናት የተከለለ አካባቢ (EA) መለያ ቁጥር	_____	
18.	የአመጋገብ ግምገማ መጠይቅ ዕላማ ያደረገዉ ?	0. እናት 1. ልጅ	
19.	መረጃ የተወሰደበት ዙር	0 አንደኛ ዙር 1 ሁለተኛ ዙር	
20	የተጠያቂው ግለሰብ ስም :	_____	
21	የተጠያቂዋ ሴት እድሜ (የተጠናቀቁትን አመታት ያስገቡ)	እድሜ በአመት (_____)	
22.	የህፃኑ ስም:	_____	
23	የትውልድ ቀን: በኢትዮጲያ አቆጣጠር ይጠቀሙ	|__|__|/|__|__|/20|__|__|	
24.	የህፃኑ እድሜ (የተጠናቀቁትን ወራት ያስገቡ)	_____ወራት	
25.	የህፃኑ ፆታ:	1= ሴት 2=ወንድ (አክብብ)	
26.	የምግብ መለኪያ ሚዛን መለያ ቁጥር	|__|__|	
27.	የትናንትናው አመጋገቦ ከወትሮው የተለየ ነበር?	1= አዎ 0= አይደለም	0 →13
28.	መልሱ አዎ ከሆነ	1= በአል/ድግስ ነበር 2= አሞኝ ነበር 3= ሌላ	
29.	[የህፃኑ ስም] የትናንትናው አመጋገብ ከወትሮው የተለየ ነበር?	1= አዎ 0= አይደለም	0 →15

30.	መልሱ አዎ ከሆነ	1= በአል/ድግስ ነበር 2= አሞት/አሟት ነበር 3= ሌላ	
31.	ትናንትና መድሐኒት ወይም በእንክብል መልክ ሚወሰድ ተጨማሪ ንጥረ-ምግብ ወስደው ነበር?	1= አዎ 0= አይደለም አዎ ካሉ ስሙ ይገለፅ ----------	
32.	[የህፃኑ ስም] ትላንትና መድሐኒት ወይም በእንክብል መልክ ሚወሰድ ተጨማሪ ንጥረ-ምግብ ወስዶ/ዳ ነበር?	1= አዎ 0= አይደለም አዎ ካሉ ስሙ ይገለፅ ----------	

አስፈላጊውን መረጃ ለመሰብሰብ የሚያስፈልጉ አካሄዶች

አሁን እርስዎ/ህፃን ልጅዎ ትናንት ከእንቅልፍ ከተነሱበት ዛሬ ከእንቅልፍ እስኪነቁ ድረስ ስለተመገቧቸው ማንኛውም ምግቦች እጠይቆታለሁ፡፡ ስለ ሰአቱ እርግጠኛ ካልሆኑ ፤ ትናንት ፀሀይ ከወጣችበት ዛሬ ፀሀይ እስከወጣችበት ያለውን ሊገልፁልኝ ይችላሉ፡፡ እባከወት በትናንትናዉ ዕለት በቤት ዉስጥ ሆነ ከቤት ዉጪ የተመገቡትን መክሶችም ጭምር ይንገሩን፡፡

1. ደረጃ 1፡ በ24 ሰአት ውስጥ የተመገቧቸውን ማንኛውም አይነት ምግቦች ወይም መጠጦች ይዘርዝሩ

5. “ትናንት ፀሀይ ከወጣች በኋላ እርስዎ/ህጻን ልጅዎ በመጀመሪያ የተመገቡት ምን ነበር?”
6. “መቼ ነበር እሱ?”
7. “ከሱ ጋር እርሶ/ልጅዎ ሌላ ነገር ወስደው ነበር?
8. “እርሶ/ልጅዎ ምንድን ነበር የወሰዳችሁት?”
9. “ቀጥሎስ እርሶ/ልጅዎ የተመገቡት/የጠጡት ነገር ምን እና መቼ ነበር?”
10. የቀኑንም ሆነ የማታ ሙሉ መረጃ እስኪያገኙ ድረስ ከ3 - 5 ያሉትን ጥያቄዎች ይቀጥሉ

- የጊዜ ማእቀፉ ትናንት ፀሀይ ከወጣችበት ዛሬ ጠዋት ፀሀይ እስከወጣችበት ድረስ ነው፡፡ ከእንቅልፍ የሚነሱበት ሰአት ከፀሀይ መውጫ ሰአት የተወሰነ የሚለያይ ከሆነ ፤ ትናንት ከእንቅልፍ ከነቁበት ዛሬ ከእንቅልፍ እስከነቁበት ያለውን ጊዜ ይጠቀሙ

2. **ደረጃ 2: በዝርዝሩ ላይ ያሉት እያንዳንዱ ምግቦች ምን ያህል እንደተበሉ ይለኩ**

11. ‘‘አሁን (እርሶ/ልጅዎ) ትናንት የተመገቡትን ምግብ ዝርዝር መረጃ ይሰጡኛል,
12. “ምግቡ ምን አይነት ነዉ?’’
13. “ምግቡ የተገኘዉ ከየት ነዉ?’’
14. ‘‘እያንዳንዱን ምግብ/ምግቡ የተሰራባቸውን ግብአቶች ምንእንደሆነ ይንገሩን’
    - ይህንን ከፍል እንዲያስታዉሱ የሚያደርግ ጥያቄ እየጠየቁ ሁሉንም እንድያስታዉሱ ይርዱዋቸዉ.
15. ‘‘ይህ የተሰራው ምግብ ምን ያህል ነው?” ወይም ’በጠቅላላ የተሰራው ምግብ መጠን ምን ያህል ነው?”

’’

16. “እንዴት ነበር የተሰራው?”

- የተጠቀሟቸውን የማብሰያ ዘዴዎችን ይለዩ (በተለይ ጥሬ ፣ የቦካ/የፈላ ወይም በዘይት የተጠበሰ ከሆነ)

3. ደረጃ 3፡ ስለ እያንዳንዱ ምግብ ተጨማሪ መግለጫዎችን ያግኙ

17. እርሶ/ልጅዎ ከተዘጋጀዉ ምግብ (እያንዳንዱን ምግብ በመጥቀስ) ምን ያክል ተመግበዋል ?”

- የማሰታወሻ ጥያቄ በመጠየቅ ያስታዉሱዋቸዉ

18. ‘‘የቀረ ምግብ ነበረ ወይ?’’
    - የቀረ ምግብ ካለ መጠኑን ይመዝግቡ.

19. ‘‘እርሶ/ልጅዎ የተመገቡትን ምግብ መጠን ምን ያክል እንደሆነ እንዲገምት የረዱኛል

    - የተመገቡትን ምግብ መጠን ምን ያክል እንደሆነ ለመገመት የተቀመጠበትን መንገድ/ዜደ ከሚከተሉት ዉስጥ የትኛዉ እንደሆነ ያክብቡ
      1. ቀጥታ ምግብን በመለካት(በግራም) 2. ተቀራራቢ ነገር በመለካት (ግራም) 3. ዉሃ በመለካት 4. በቁጥር 5. ሌላ (ይገለጽ)

4. ደረጃ 4፡ ሁሉንም የተበሉትን ነገሮች ያረጋግጡ

ለተጠያቂዋ መረጃውን በፍጥነት ያንብቡላቸው “ያላካተትኩት/የረሳሁት ነገር አለ?”

ክፍል 2. ፈጣን ዝርዝር

ደረጃ 1፡

እባክዎ ትናንት ቀን እንዲሁም ማታ በቤት ውስጥም ሆነ ከቤት ውጪ የተመገቧቸውን ወይም የጠጧቸውን ነገሮች (ዋና የመመገቢያ ሰአት ምግቦች እንዲሁም መክሰሶች) ይግለፁልኝ፡፡ ጧት ከተመገቡት ወይም ከጠጡት ነገር ይጀምሩ፡፡

የተጠቀሱትን ምግቦች እና መጠጦች ሁሉ ይመዝግቡ፡፡ ከተለያዩ ግብአቶች የተሰሩ ምግቦች ሲጠቀሱ የግብአቶቹን ዝርዝር ይጠይቁ፡፡

ምላሽ ሰጪዋ ሲጨርሱ ያልተጠቀሱ ዋና የመመገቢያ ሰአት ምግቦችን ወይም መክሰሶችን ያውጣጡ

ጠዋት	**መክሰስ (ረፋድ ላይ)**	**ቀትር**	**መክሰስ (ከሰአት በኋላ)**	**ማታ**	**መክሰስ (ማታ ከእራት በኋላ/ሌሊት)**

ሰአት: 1=ጠዋት (ትናንት ፀሀይ ከወጣችበት ~5:30) ፤ 2=ከሰአት (~5:30-ፀሀይ እስከትገባ) ፤ 3= ምሽት/ማታ (ትናንት ፀሀይ ከገባችበት ልክ ዛሬ ጠዋት ከመውጣቷ በፊት እስካለው)

የምግቡ መለያ ቁጥር	“ትናንት ፀሀይ ከወጣች በኋላ እርስዎ/ህጻን ልጅዎ በመጀመሪያ የተመገቡት ምን ነበር? ሌላስ?	ሰአት	እባክዎን ይህንን ምግብ /መጠጥ/ ምግቡ የተሰራበትን ግብአት ይግለፁ:	አሰራሩ እንዴት ነበር?	ምግቡ የተዘጋጀዉ የት ነዉ	ምግቡ የተለካበት መንገድ	የቀረበዉ ምግብ	የተረፈዉ ምግብ	የተበላዉ	Recipe information			
										የግብአቱ ሁኔታ	ምግቡ የተዘጋጀበት ሁኔታ	አጠቃላይ የተዘጋጀዉ ምግብ	ምግቡ ከምን ጋር እንደቀረበ
1													
	ምግቡ የተሰራበት ግብአት		መግለጫ										
					NA								
					NA								
					NA								
					NA								
					NA								
2													
					NA								
					NA								
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					NA								
3													
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					NA								
					NA								
					NA								

መምግብ የተበላበት ጊዜ፡ 1. ጠዋት ቁርስ 2. ረፋድ 3. ቀትር 4. ከሰአት 5. ማታ 6. ሌሊት

መምግብ የተበላበት፡ 1. ቤት የተሰራ 2. ከቤት ዉጪ የተሰራ

እንዴት ነው የተሰራው? 1=ጥሬ/ ምንም ያልተለወጠ/ እንደተገዛ ፤ **2=**የቦካ/የፈላ ፤ **3=**የተጠበሰ ፤ **04=**የበሰለ ወይም የተቀቀለ - እርጥብ ሙቀት **5=**የተጋገረ/ የተጠበሰ ፤ **6**=በቤት/በባህላዊ መንገድ የተፈጨ ፤ **7=**የተገነፈለ (የፈላ ውሀ ውስጥ የተነከረ) ፤ **8**=ሌላ

ምግቡ የተለካዉ እንደት ነዉ 1. በቀጥታ ልከት (በግራም) 2. ተቀራራቢ በሆነ ነገር (በግራም) 3.ዉሃ 4. በቁጥር 5. ሌላ (ይገለጽ)

የምግብ ሁነታ፡ 1. ጥሬ 2. የተቀቀለ 3. የተጠበሰ 4. የተቆላ 5. ሌላ (ይገለጽ)

ሰአት: 1=ጠዋት (ትናንት ፀሀይ ከወጣችበት ~5:30) ፤ 2=ከሰአት (~5:30-ፀሀይ እስከትገባ) ፤ 3= ምሽት/ማታ (ትናንት ፀሀይ ከገባችበት ልክ ዛሬ ጠዋት ከመውጣቷ በፊት እስካለው)

የምግቡ መለያ ቁጥር	“ትናንት ፀሀይ ከወጣች በኋላ እርስዎ/ህጻን ልጅዎ በመጀመሪያ የተመገቡት ምን ነበር? ሌላስ?	ሰአት	እባክዎን ይህንን ምግብ /መጠጥ/ ምግቡ የተሰራበትን ግብአት ይግለፁ፡	አሰራሩ እንዴት ነበር?	ምግቡ የተዘጋጀዉ የት ነዉ	ምግቡ የተለካበት መንገድ	የቀረበዉ ምግብ	የተረፈዉ ምግብ	የተበላዉ	Recipe information			
										የግብአቱ ሁኔታ	ምግቡ የተዘጋጀበት ሁኔታ	አጠቃላይ የተዘጋጀዉ ምግብ	ምግቡ ከምን ጋር እንደቀረበ
1													
	ምግቡ የተሰራበት ግብአት		መግለጫ										
					NA								
					NA								
					NA								
					NA								
2													
					NA								
					NA								
					NA								

የምግቡ መለያ ቁጥር	"ትናንት ፀሀይ ከወጣች በኋላ እርስዎ/ህጻን ልጅዎ በመጀመሪያ የተመገቡት ምን ነበር? ሌላስ?	ሰአት	እባክዎን ይህንን ምግብ /መጠጥ/ ምግቡ የተሰራበትን ግብአት ይግለፁ:	አሰራሩ እንዴት ነበር?	ምግቡ የተዘጋጀዉ የት ነዉ	የምግቡ የተለካበት መለኪያ	የቀረበ መጠን	የተረፈ መጠን	የተበላዉ	Recipe information			
										የምግቡ ሁኔታ	ምግቡ የተዘጋጀበት ሁኔታ	ከጨካላይ የተዘጋጀዉ ምግብ	ከሆነ ምግቡ እንደቀረበ
					NA								
3													
					NA								
					NA								
					NA								
					NA								
					NA								

መምግብ የተበላበት ጊዜ፡ 1. ጠዋት ቁርስ 2. ረፋድ 3. ቀትር 4. ከሰአት 5. ማታ 6. ሌሊት

መምግብ የተበላበት፡ 1. ቤት የተሰራ 2. ከቤት ዉጪ የተሰራ

እንዴት ነው የተሰራው? 1=ጥሬ/ ምንም ያልተለወጠ/ እንደተገዛ ፤ **2=**የቦካ/የፈላ ፤ **3=**የተጠበሰ ፤ **04=**የበሰለ ወይም የተቀቀለ - እርጥብ ሙቀት **5=**የተጋገረ/ የተጠበሰ ፤ **6=**በቤት/በባህላዊ መንገድ የተፈጨ ፣ **7=**የተነፋለ (የፈላ ውሀ ውስጥ የተነከረ) ፤ **8**=ሌላ

ምግቡ የተለካዉ እንደት ነዉ 1. በቀጥታ ልክት (በግራም) 2. ተቀራራቢ በሆነ ነገር (በግራም) 3.ዉሃ 4. በቁጥር 5. ሌላ (ይገለጽ)

የምግብ ሁኔታ፡ 1. ጥሬ 2. የተቀቀለ 3. የተጠበሰ 4. የተቆላ 5. ሌላ (ይገለጽ)

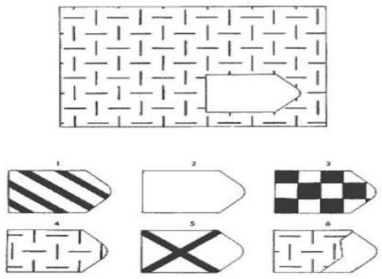
Module III: Cognitive Skills

A1. Ravens Progressive Matrices

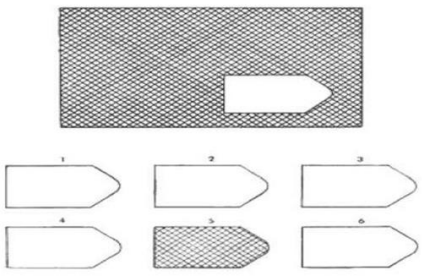
This test consists of 10 questions. For each question, you will be shown a square with a specific pattern. Each square has a gap. You are given a number of possible pictures. Choose the picture that would fit in the gap and follows the pattern of the square.

ENUMERATOR: Before you start, explain to the respondent about the nature of the game using the example given on the tablet. Only once you are confident that the respondent has understood the game, you can show the tablet with the rest of the pictures to her. Tell the respondent that she has only **8 minutes** to complete all the 10 questions.

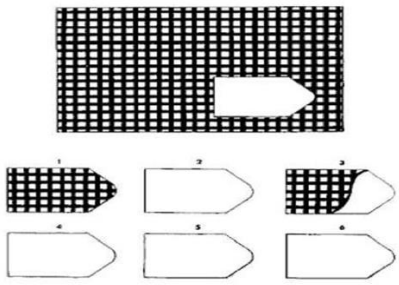
Example



A.1.1

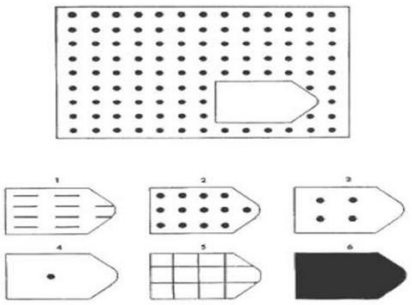


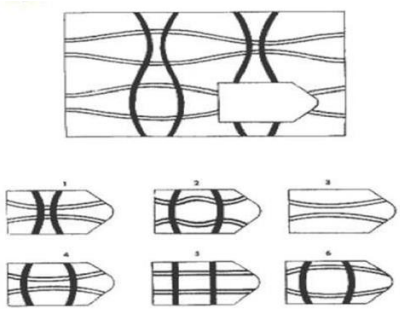
A.1.2.



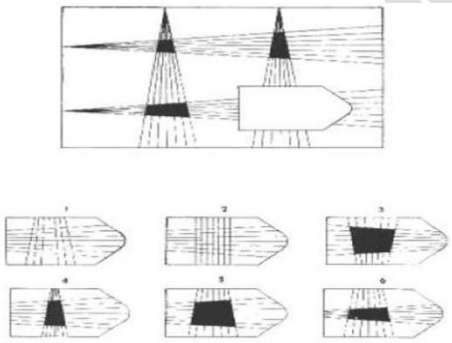
A.1.3.

A.1.4.

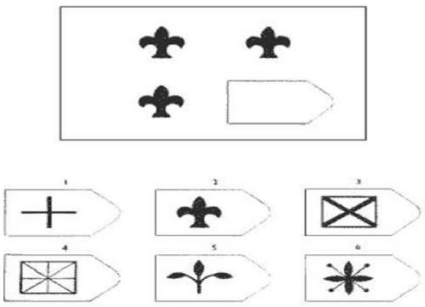




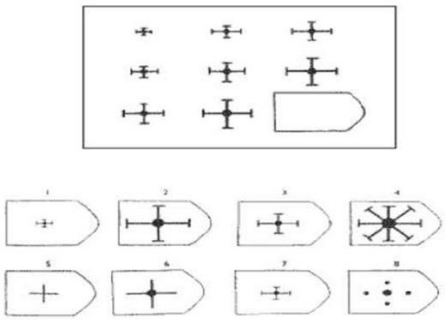
A.1.5.



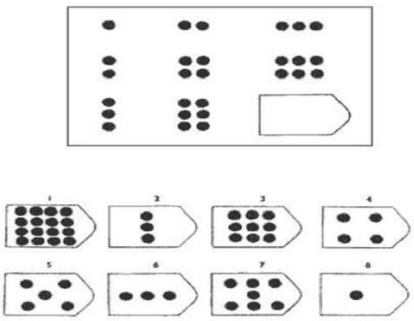
A.1.6.



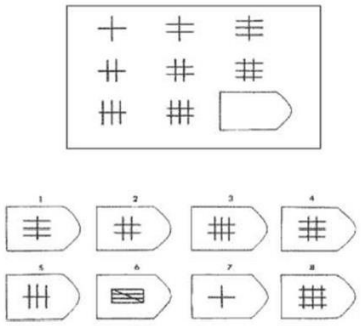
A.1.7.



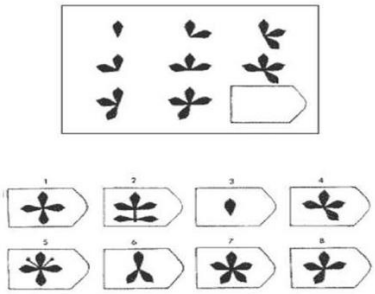
A.1.8.



A.1.9.



A.1.10.



A2. Digits Reverse

I will read some numbers and listen carefully. Please repeat them back to me in reverse order. For example, if I say "1-2", you should say "2-1" back to me. To practice, if I say "8-4" what would you say? [ENUMERATOR: Should be "4-8"]. I will read each sequence of numbers only once.

A2.1	6 - 1 [Should be 1 - 6]	1. Correct 2. Incorrect
A2.2	2 - 5 - 10 [Should be 10 - 5 - 2]	1. Correct 2. Incorrect
A2.3	3 - 8 - 7 [Should be 7 - 8 - 3]	1. Correct 2. Incorrect
A2.4	0 - 3 - 6 - 9 [Should be 9 - 6 - 3 - 0]	1. Correct 2. Incorrect
A2.5	9 - 2 - 4 - 7 [Should be 7 - 4 - 2 - 9]	1. Correct 2. Incorrect
A2.6	8 - 3 - 1 - 6 - 2 [Should be 2 - 6 - 1 - 3 - 8]	1. Correct 2. Incorrect
A2.7	2 - 0 - 4 - 8 - 5 - 7 [Should be 7 - 5 - 8 - 4 - 0 - 2]	1. Correct 2. Incorrect